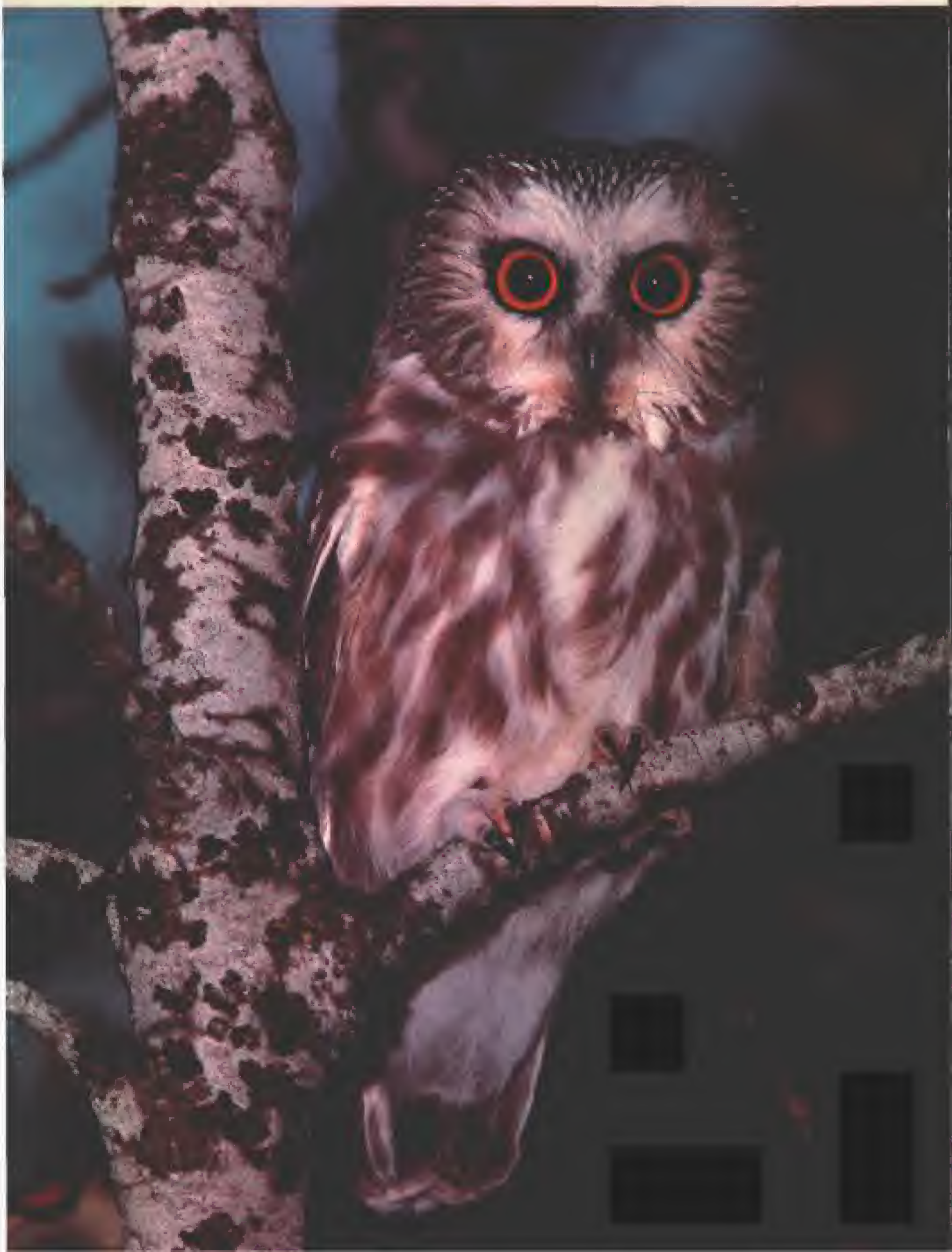
# WESTERN BIRDS

**Vol. 12, No. 4, 1981**



SHOUT
SHARE
IT

**WESTERN BIRDS**

Quarterly Journal of Western Field Ornithologists

*President:* Terence R. Wahl *Vice-President:* Laurence C. Binford

*Treasurer/ Membership Secretary:* Garth Alton *Circulation Manager:* Elizabeth Copper

*Secretary:* Phyllis Bailey

*Directors:* Laurence C. Binford, Jeanne A. Conry, David F. DeSante, Stephen A. Laymon, John S. Luther, Guy McCaskie, Richard W. Stallcup, Terence R. Wahl, Timothy Manolis

*Editor:* Alan M. Craig

*Associate Editors:* Cameron Barrows, Narca A. Moore-Craig

*Editorial Board:* Robert Andrews, Alan Baldridge, William H. Behle, Andrew J. Berger, Laurence C. Binford (Chairman), Jeanne A. Conry, David F. DeSante, Richard Erickson, Joseph Greenberg, Joseph R. Jehl, Jr., Ned K. Johnson, Virginia P. Johnson, Brina Kessel, Charles S. Lawson, Stephen A. Laymon, John S. Luther, Tim Manolis, Brian J. McCaffery, Guy McCaskie, M. Timothy Myres, Harry B. Nehls, Thomas L. Rodgers, Stephen M. Russell, Oliver K. Scott, P. David Skaar, Richard W. Stallcup, David Stirling, G. Shumway Suffel, Charles Trost, Terence R. Wahl, Roland H. Wauer, Bruce Webb, Dale A. Zimmerman

Layout artist: Virginia P. Johnson

Membership dues, for individuals and institutions, including subscription to *Western Birds:* Patron, $1000; Life, $150; Supporting, $30 annually; Contributing, $20 annually; Regular $14 U.S. ($17 outside U.S.), annually. Dues and contributions are tax-deductible to the extent allowed by law.

Send membership dues, changes of address, and correspondence regarding missing issues to Garth Alton, 17 Camino Lenada, Orinda, CA 94563. Make checks payable to Western Field Ornithologists.

Send orders for back issues and special publications to Elizabeth Copper, P.O. Box 595, Coronado, CA 92118. Back issues of *California Birds/Western Birds:* $15 per volume, $4.00 for single issues. Xerox copies of out of print issues (Vol. 1, No. 1; Vol. 2, Nos. 1 and 4; Vol. 6, No. 2): $4.50 each. *Checklist of the Birds of California:* $2.00 each, 10 or more $1.50 each. *Pelagic Birds of Monterey Bay, California:* $2.50 each, 10 or more $2.00 each, 40 or more $1.50 each. All postpaid.

Send rare bird reports for Arizona to Robert A. Witzeman, 4619 E. Arcadia Lane, Phoenix, AZ 85018; for California, to B.D. Parmeter, 2500 Emerson Street, Napa, CA 94558; for Colorado, to CFO Records Committee, Denver Museum of Natural History, City Park, Denver, CO 80205; for Oregon, to Oregon Bird Records Committee, P.O. Box 10373, Eugene, OR 97440; and for Vancouver, British Columbia, to Wayne C. Weber, 303-9153 Saturna Drive, Burnaby, B.C. V3J 7K1.

Published — March 21, 1983.

WESTERN BIRDS ADVERTISING RATES AND SPECIFICATIONS

| | | | |
|---|---|---|---|
| Full Page | 4 x 6¾ inches | $60 per issue | $200 per year |
| Half Page | 4 x 3⅜ inches | $40 per issue | $130 per year |
| Quarter Page | 4 x 1 11/16 inches | $30 per issue | $110 per year |

Offset printing, one column per page, 4 inches wide. Glossy, black and white photos are acceptable; half-tone screen size: 133 line. Photo-ready copy is requested. If this is not possible, extra charges for typesetting will be made as follows: $15 full page, $10 half page, $5 quarter page. Send copy with remittance to Garth Alton, 17 Camino Lenada, Orinda, CA 94563. Make checks payable to Western Field Ornithologists. A 15% commission is allowed for agencies.

WESTERN BIRDS

Volume 12, Number 4, 1981

# A CHECKLIST OF THE BIRDS OF OREGON

THOMAS J. CRABTREE, 1667 NW Iowa, Bend, Oregon 97701

HARRY B. NEHLS, 2736 SE 20th, Portland, Oregon 97202

The official state bird list for Oregon has not been updated since 1940 when Gabrielson and Jewett published their monumental work, *Birds of Oregon*. Since that time many additional birds have been recorded in Oregon. Others have significantly changed their status and distribution. The need for a revision of the official state list has prompted the publication of this paper.

In early 1978 the Oregon Bird Records Committee was formed to consider the records of rare and unusual birds from within the State, including the adjacent ocean from shore to a distance of 100 miles. The primary functions of the Committee are to review bird records; to accept those with sufficient documentation; to maintain a permanent file for photographs, tape recordings, sonograms and written documentation of rare bird observations; and to make this material available for research and review.

The Oregon Bird Records Committee is a committee of the Oregon Field Ornithologists (OFO). This statewide organization was created to upgrade the standards of Oregon birding and to provide a medium for publishing the results of field studies conducted within the state. A quarterly journal, *Oregon Birds*, is published by OFO to meet this commitment. At the present time OFO, in cooperation with the Audubon Society of Portland, is preparing a long-overdue revision of *Birds of Oregon*.

The present bird list includes 415 species documented by an identifiable photograph on file with the Oregon Bird Records Committee or a specimen deposited in a museum to substantiate their occurrence in Oregon. Also included are 12 species whose presence on the official list is based upon a sight record only. These are so designated in the list. All sight records have been carefully reviewed and accepted by the Oregon Bird Records Committee. Written documentation of these sightings is available from the Committee Secretary.

All species on the list have been investigated and are believed to have reached the state under their own power, except those that were deliberately introduced and have established viable breeding populations. The latter species are noted in the list as having been introduced.

## NOMENCLATURE

Nomenclature and classification essentially follows the AOU Check-list (1957) as corrected (1962) and as amended (1973, 1976). In several instances the list deviates from the AOU Check-list to conform to recently published scientific evidence. These changes are expected to be endorsed by the AOU in future revisions. Shorebird classifications follow those recommended by Jehl (1968).

## KEY TO THE LIST

Within the list species are coded as follows:

N — Nested successfully at least twice.
pN — Presumed to nest.
X — Irregular, casual or accidental.
E — Extirpated.
S — Sight record only.
I — Introduced. (Includes those which have reached the state as a result of being introduced elsewhere.)

Those species for which the Oregon Bird Records Committee seeks documentation are preceded by an asterisk (*). Birds with no asterisk are known to occur with some regularity in Oregon, and no documentation is requested for sightings of these species. Any bird which is not on the list and is seen within the state needs careful documentation.

Please send any documentation of sightings or requests for information to: Oregon Bird Records Committee, P.O. Box 10373, Eugene, OR 97440.

# A CHECKLIST OF THE BIRDS OF OREGON

## GAVIIDAE

Common Loon
*Gavia immer*
• Yellow-billed Loon X
*Gavia adamsii*
Arctic Loon
*Gavia arctica*
Red-throated Loon
*Gavia stellata*

## PODICIPEDIDAE

Red-necked Grebe N
*Podiceps grisegena*
Horned Grebe pN
*Podiceps auritus*
Eared Grebe N
*Podiceps nigricollis*
Western Grebe N
*Aechmophorus occidentalis*
Pied-billed Grebe N
*Podilymbus podiceps*

## DIOMEDEIDAE

• Short-tailed Albatross X
*Diomedea albatrus*
Black-footed Albatross
*Diomedea nigripes*
• Laysan Albatross X
*Diomedea immutabilis*

## PROCELLARIIDAE

Northern Fulmar
*Fulmarus glacialis*
Pink-footed Shearwater
*Puffinus creatopus*
• Flesh-footed Shearwater X
*Puffinus carneipes*
New Zealand Shearwater
*Puffinus bulleri*
Sooty Shearwater
*Puffinus griseus*
• Short-tailed Shearwater X
*Puffinus tenuirostris*
• Manx Shearwater S
*Puffinus puffinus*
• Mottled Petrel X
*Pterodroma inexpectata*

## HYDROBATIDAE

Fork-tailed Storm-Petrel N
*Oceanodroma furcata*
Leach's Storm-Petrel N
*Oceanodroma leucorhoa*
• Wilson's Storm-Petrel S
*Oceanites oceanicus*

## PELECANIDAE

White Pelican N
*Pelecanus erythrorhynchos*
Brown Pelican
*Pelecanus occidentalis*

## PHALACROCORACIDAE

Double-crested Cormorant N
*Phalacrocorax auritus*
Brandt's Cormorant N
*Phalacrocorax penicillatus*
Pelagic Cormorant N
*Phalacrocorax pelagicus*

## FREGATIDAE

• Magnificent Frigatebird X
*Fregata magnificens*

## ARDEIDAE

Great Blue Heron N
*Ardea herodias*
Green Heron N
*Butorides striatus*
Cattle Egret
*Bubulcus ibis*
Great Egret N
*Casmerodius albus*
Snowy Egret N
*Egretta thula*
• Louisiana Heron X
*Hydranassa tricolor*
Black-crowned Night Heron N
*Nycticorax nycticorax*
• Least Bittern pN
*Ixobrychus exilis*
American Bittern N
*Botaurus lentiginosus*

THRESKIORNITHIDAE

White-faced Ibis N
*Plegadis chihi*

ANATIDAE

Mute Swan I
*Cygnus olor*
Whistling Swan
*Olor columbianus*
Trumpeter Swan N
*Olor buccinator*
Canada Goose N
*Branta canadensis*
Brant
*Branta bernicla*
Emperor Goose X
*Philacte canagica*
White-fronted Goose
*Anser albifrons*
Snow Goose
*Chen caerulescens*
Ross' Goose
*Chen rossii*
• Fulvous Whistling-Duck X
*Dendrocygna bicolor*
Mallard N
*Anas platyrhynchos*
• Black Duck X
*Anas rubripes*
Gadwall N
*Anas strepera*
Pintail N
*Anas acuta*
Green-winged Teal N
*Anas crecca*
• Baikal Teal X
*Anas formosa*
Blue-winged Teal N
*Anas discors*
Cinnamon Teal N
*Anas cyanoptera*
Northern Shoveler N
*Anas clypeata*
European Wigeon
*Anas penelope*
American Wigeon N
*Anas americana*
Wood Duck N
*Aix sponsa*
Canvasback N
*Aythya valisineria*
Redhead N
*Aythya americana*
Ring-necked Duck N
*Aythya collaris*
Greater Scaup
*Aythya marila*
Lesser Scaup N
*Aythya affinis*
• Tufted Duck X
*Aythya fuligula*
Common Goldeneye
*Bucephala clangula*
Barrow's Goldeneye N
*Bucephala islandica*
Bufflehead N
*Bucephala albeola*
Oldsquaw
*Clangula hyemalis*
Harlequin Duck N
*Histrionicus histrionicus*
• King Eider X
*Somateria spectabilis*
White-winged Scoter
*Melanitta deglandi*
Surf Scoter
*Melanitta perspicillata*
Black Scoter
*Melanitta nigra*
Ruddy Duck N
*Oxyura jamaicensis*
Hooded Merganser N
*Lophodytes cucullatus*
Common Merganser N
*Mergus merganser*
Red-breasted Merganser
*Mergus serrator*

CATHARTIDAE

Turkey Vulture N
*Cathartes aura*
• California Condor E
*Gymnogyps californianus*

ACCIPITRIDAE

White-tailed Kite N
*Elanus leucurus*
Goshawk N
*Accipiter gentilis*
Sharp-shinned Hawk N
*Accipiter striatus*
Cooper's Hawk N
*Accipiter cooperii*
Red-tailed Hawk N
*Buteo jamaicensis*

Red-shouldered Hawk N
*Buteo lineatus*
Swainson's Hawk N
*Buteo swainsoni*
Rough-legged Hawk
*Buteo lagopus*
Ferruginous Hawk N
*Buteo regalis*
Golden Eagle N
*Aquila chrysaetos*
Bald Eagle N
*Haliaeetus leucocephalus*
Marsh Hawk N
*Circus cyaneus*

PANDIONIDAE

Osprey N
*Pandion haliatus*

FALCONIDAE

* Gyrfalcon X
*Falco rusticolus*
Prairie Falcon N
*Falco mexicanus*
Peregrine Falcon N
*Falco peregrinus*
Merlin N
*Falco columbarius*
American Kestrel N
*Falco sparverius*

TETRAONIDAE

Blue Grouse N
*Dendragapus obscurus*
Spruce Grouse N
*Canachites canadensis*
Ruffed Grouse N
*Bonasa umbellus*
White-tailed Ptarmigan I
*Lagopus leucurus*
* Sharp-tailed Grouse E?
*Pediocetes phasianellus*
Sage Grouse N
*Centrocercus urophasianus*

PHASIANIDAE

Bobwhite I
*Colinus virginianus*
California Quail N
*Lophortyx californicus*
Mountain Quail N
*Oreortyx pictus*
Ring-necked Pheasant I
*Phasianus colchicus*
Chukar I
*Alectoris chukar*
Gray Partridge I
*Perdix perdix*

MELEAGRIDIDAE

Turkey I
*Meleagris gallopavo*

GRUIDAE

Sandhill Crane N
*Grus canadensis*

RALLIDAE

Virginia Rail N
*Rallus limicola*
Sora N
*Porzana carolina*
* Yellow Rail X
*Coturnicops noveboracensis*
* Common Gallinule X
*Gallinula chloropus*
American Coot N
*Fulica americana*

HAEMATOPODIDAE

Black Oystercatcher N
*Haematopus bachmani*

RECURVIROSTRIDAE

Black-necked Stilt N
*Himantopus mexicanus*
American Avocet N
*Recurvirostra americana*

CHARADRIIDAE

Semipalmated Plover
*Charadrius semipalmatus*
Killdeer N
*Charadrius vociferus*
Snowy Plover N
*Charadrius alexandrinus*
* Mongolian Plover X
*Charadrius mongolus*
* Mountain Plover X
*Charadrius montanus*
Lesser Golden Plover
*Pluvialis dominica*
Black-bellied Plover
*Pluvialis squatarola*

SCOLOPACIDAE

* Hudsonian Godwit X
*Limosa haemastica*
* Bar-tailed Godwit X
*Limosa lapponica*
Marbled Godwit
*Limosa fedoa*
Whimbrel
*Numenius phaeopus*
Long-billed Curlew N
*Numenius americanus*
Upland Sandpiper N
*Bartramia longicauda*
* Spotted Redshank X
*Tringa erythropus*
Greater Yellowlegs
*Tringa melanoleuca*
Lesser Yellowlegs
*Tringa flavipes*
Solitary Sandpiper
*Tringa solitaria*
Willet N
*Catoptrophorus semipalmatus*
Spotted Sandpiper N
*Actitis macularia*
Wandering Tattler
*Heteroscelus incanus*
Ruddy Turnstone
*Arenaria interpres*
Black Turnstone
*Arenaria melanocephala*
Wilson's Phalarope N
*Phalaropus tricolor*
Northern Phalarope
*Phalaropus lobatus*
Red Phalarope
*Phalaropus fulicarius*
Common Snipe N
*Capella gallinago*
Short-billed Dowitcher
*Limnodromus griseus*
Long-billed Dowitcher
*Limnodromus scolopaceus*
Surfbird
*Aphriza virgata*
Red Knot
*Calidris canutus*
Sanderling
*Calidris alba*
* Semipalmated Sandpiper
*Calidris pusilla*
Western Sandpiper
*Calidris mauri*
* Rufous-necked Sandpiper S
*Calidris ruficollis*
* Long-toed Stint X
*Calidris subminuta*
Least Sandpiper
*Calidris minutilla*
Baird's Sandpiper
*Calidris bairdii*
Pectoral Sandpiper
*Calidris melanotos*
* Sharp-tailed Sandpiper X
*Calidris acuminata*
Rock Sandpiper
*Calidris ptilocnemis*
Dunlin
*Calidris alpina*
* Curlew Sandpiper S
*Calidris ferruginea*
* Stilt Sandpiper X
*Micropalma himantopus*
* Buff-breasted Sandpiper
*Tryngites subruficollis*
* Ruff X
*Philomachus pugnax*

STERCORARIIDAE

Pomarine Jaeger
*Stercorarius pomarinus*
Parasitic Jaeger
*Stercorarius parasiticus*
Long-tailed Jaeger
*Stercorarius longicaudus*
South Polar Skua
*Catharacta maccormicki*

LARIDAE

Glaucous Gull
*Larus hyperboreus*
Glaucous-winged Gull N
*Larus glaucescens*
Western Gull N
*Larus occidentalis*
Herring Gull
*Larus argentatus*
Thayer's Gull
*Larus thayeri*
California Gull N
*Larus californicus*
Ring-billed Gull N
*Larus delawarensis*
Mew Gull
*Larus canus*

Franklin's Gull N
*Larus pipixcan*
Bonaparte's Gull
*Larus philadelphia*
• Little Gull X
*Larus minutus*
Heermann's Gull
*Larus heermanni*
Black-legged Kittiwake
*Rissa tridactyla*
• Red-legged Kittiwake X
*Rissa brevirostris*
Sabine's Gull
*Xema sabini*
Forster's Tern N
*Sterna forsteri*
Common Tern
*Sterna hirundo*
Arctic Tern
*Sterna paradisaea*
• Least Tern X
*Sterna albifrons*
Caspian Tern N
*Sterna caspia*
Black Tern N
*Chlidonias niger*

ALCIDAE

Common Murre N
*Uria aalge*
• Thick-billed Murre X
*Uria lomvia*
Pigeon Guillemot N
*Cepphus columba*
Marbled Murrelet pN
*Brachyramphus marmoratus*
• Xantus' Murrelet X
*Endomychura hypoleuca*
• Craveri's Murrelet X
*Endomychura craveri*
Ancient Murrelet
*Synthliboramphus antiquus*
Cassin's Auklet N
*Ptychoramphus aleuticus*
• Parakeet Auklet X
*Cyclorrhynchus psittacula*
Rhinoceros Auklet N
*Cerorhinca monocerata*
• Horned Puffin X
*Fratercula corniculata*
Tufted Puffin N
*Lunda cirrhata*

COLUMBIDAE

Band-tailed Pigeon N
*Columba fasciata*
Rock Dove I
*Columba livia*
• White-winged Dove X
*Zenaida asiatica*
Mourning Dove N
*Zenaida macroura*

CUCULIDAE

• Yellow-billed Cuckoo N
*Coccyzus americanus*

TYTONIDAE

Barn Owl N
*Tyto alba*

STRIGIDAE

Screech Owl N
*Otus asio*
Flammulated Owl N
*Otus flammeolus*
Great Horned Owl N
*Bubo virginianus*
Snowy Owl X
*Nyctea scandiaca*
• Hawk Owl S
*Surnia ulula*
Pygmy Owl N
*Glaucidium gnoma*
Burrowing Owl N
*Athene cunicularia*
• Barred Owl N
*Strix varia*
Spotted Owl N
*Strix occidentalis*
Great Gray Owl N
*Strix nebulosa*
Long-eared Owl N
*Asio otus*
Short-eared Owl N
*Asio flammeus*
• Boreal Owl X
*Aegolius funereus*
Saw-whet Owl N
*Aegolius acadicus*

CAPRIMULGIDAE

Poor-will N
*Phalaenoptilus nuttallii*
Common Nighthawk N
*Chordeiles minor*

APODIDAE

Black Swift
*Cypseloides niger*
Vaux's Swift N
*Chaetura vauxi*
White-throated Swift N
*Aeronautes saxatalis*

TROCHILIDAE

Black-chinned Hummingbird N
*Archilochus alexandri*
• Costa's Hummingbird X
*Calypte costae*
Anna's Hummingbird N
*Calypte anna*
Broad-tailed Hummingbird X
*Selasphorus platycercus*
Rufous Hummingbird N
*Selasphorus rufus*
Allen's Hummingbird N
*Selasphorus sasin*
Calliope Hummingbird N
*Stellula calliope*

ALCEDINIDAE

Belted Kingfisher N
*Megaceryle alcyon*

PICIDAE

Common Flicker N
*Colaptes auratus*
Pileated Woodpecker N
*Dryocopus pileatus*
Acorn Woodpecker N
*Melanerpes formicivorus*
Lewis' Woodpecker N
*Melanerpes lewis*
Yellow-bellied Sapsucker N
*Sphyrapicus varius*
Williamson's Sapsucker N
*Sphyrapicus thyroideus*
Hairy Woodpecker N
*Picoides villosus*
Downy Woodpecker N
*Picoides pubescens*
• Nuttall's Woodpecker X
*Picoides nuttallii*
White-headed Woodpecker N
*Picoides albolarvatus*
Black-backed Three-toed Woodpecker N
*Picoides arcticus*
Northern Three-toed Woodpecker N
*Picoides tridactylus*

TYRANNIDAE

Eastern Kingbird N
*Tyrannus tyrannus*
• Tropical Kingbird X
*Tyrannus melancholicus*
Western Kingbird N
*Tyrannus verticalus*
• Cassin's Kingbird X
*Tyrannus vociferans*
• Scissor-tailed Flycatcher X
*Muscivora forficata*
Ash-throated Flycatcher N
*Myiarchus cinerascens*
Black Phoebe N
*Sayornis nigricans*
Say's Phoebe N
*Sayornis saya*
Willow Flycatcher N
*Empidonax traillii*
• Least Flycatcher X
*Empidonax minimus*
Hammond's Flycatcher N
*Empidonax hammondii*
Dusky Flycatcher N
*Empidonax oberholseri*
Gray Flycatcher N
*Empidonax wrightii*
Western Flycatcher N
*Empidonax difficilis*
Western Wood Pewee N
*Contopus sordidulus*
Olive-sided Flycatcher N
*Nuttallornis borealis*

ALAUDIDAE

Horned Lark N
*Eremophila alpestris*

HIRUNDINIDAE

Violet-green Swallow N
*Tachycineta thalassina*
Tree Swallow N
*Iridoprocne bicolor*
Bank Swallow N
*Riparia riparia*
Rough-winged Swallow N
*Stelgidopteryx ruficollis*
Barn Swallow N
*Hirundo rustica*
Cliff Swallow N
*Petrochelidon pyrrhonota*
Purple Martin N
*Progne subis*

CORVIDAE

Gray Jay N
*Perisoreus canadensis*
* Blue Jay X
*Cyanocitta cristata*
Steller's Jay N
*Cyanocitta stelleri*
Scrub Jay N
*Aphelocoma coerulescens*
Black-billed Magpie N
*Pica pica*
Common Raven N
*Corvus corax*
Common Crow N
*Corvus brachyrhynchos*
Northwestern Crow
*Corvus caurinus*
Piñon Jay N
*Gymnorhinus cyanocephalus*
Clark's Nutcracker N
*Nucifraga columbiana*

PARIDAE

Black-capped Chickadee N
*Parus atricapillus*
Mountain Chickadee N
*Parus gambeli*
Chestnut-backed Chickadee N
*Parus rufescens*
Plain Titmouse N
*Parus inornatus*
Bushtit N
*Psaltriparus minimus*

SITTIDAE

White-breasted Nuthatch N
*Sitta carolinensis*
Red-breasted Nuthatch N
*Sitta canadensis*
Pygmy Nuthatch N
*Sitta pygmaea*

CERTHIIDAE

Brown Creeper N
*Certhia familiaris*

CHAMAEIDAE

Wrentit N
*Chamaea fasciata*

CINCLIDAE

Dipper N
*Cinclus mexicanus*

TROGLODYTIDAE

House Wren N
*Troglodytes aedon*
Winter Wren N
*Troglodytes troglodytes*
Bewick's Wren N
*Thryomanes bewickii*
Long-billed Marsh Wren N
*Cistothorus palustris*
Canyon Wren N
*Catherpes mexicanus*
Rock Wren N
*Salpinctes obsoletus*

MIMIDAE

Mockingbird
*Mimus polyglottos*
Gray Catbird N
*Dumetella carolinensis*
* Brown Thrasher X
*Toxostoma rufum*
* California Thrasher S
*Toxostoma redivivum*
Sage Thrasher N
*Oreoscoptes montanus*

TURDIDAE

American Robin N
*Turdus migratorius*
Varied Thrush N
*Ixoreus naevius*
* Wood Thrush S
*Hylocichla mustelina*
Hermit Thrush N
*Catharus guttatus*
Swainson's Thrush N
*Catharus ustulatus*
Veery N
*Catharus fuscescens*
Western Bluebird N
*Sialia mexicana*
Mountain Bluebird N
*Sialia currucoides*
* Wheatear X
*Oenanthe oenanthe*
Townsend's Solitaire N
*Myadestes townsendi*

SYLVIIDAE

Blue-gray Gnatcatcher N
*Polioptila caerulea*
Golden-crowned Kinglet N
*Regulus satrapa*
Ruby-crowned Kinglet N
*Regulus calendula*

MOTACILLIDAE

* White Wagtail X
*Motacilla alba*
Water Pipit N
*Anthus spinoletta*

BOMBYCILLIDAE

Bohemian Waxwing
*Bombycilla garrulus*
Cedar Waxwing N
*Bombycilla cedrorum*

PTILOGONATIDAE

* Phainopepla X
*Phainopepla nitens*

LANIIDAE

Northern Shrike
*Lanius excubitor*
Loggerhead Shrike N
*Lanius ludovicianus*

STURNIDAE

Starling I
*Sturnus vulgaris*

VIREONIDAE

Hutton's Vireo N
*Vireo huttoni*
* Bell's Vireo S
*Vireo bellii*
Solitary Vireo N
*Vireo solitarius*
Red-eyed Vireo N
*Vireo olivaceus*
Warbling Vireo N
*Vireo gilvus*

PARULIDAE

* Black-and-white Warbler X
*Mniotilta varia*
* Prothonotary Warbler X
*Protonotaria citrea*
* Golden-winged Warbler S
*Vermivora chrysoptera*
* Tennessee Warbler X
*Vermivora peregrina*
Orange-crowned Warbler N
*Vermivora celata*
Nashville Warbler N
*Vermivora ruficapilla*
* Virginia's Warbler X
*Vermivora virginiae*
* Northern Parula X
*Parula americana*
Yellow Warbler N
*Dendroica petechia*
* Magnolia Warbler X
*Dendroica magnolia*
* Cape May Warbler X
*Dendroica tigrina*
* Black-throated Blue Warbler X
*Dendroica caerulescens*
Yellow-rumped Warbler N
*Dendroica coronata*
Black-throated Gray Warbler N
*Dendroica nigrescens*
Townsend's Warbler N
*Dendroica townsendi*
Hermit Warbler N
*Dendroica occidentalis*
* Chestnut-sided Warbler X
*Dendroica pensylvanica*
* Bay-breasted Warbler X
*Dendroica castanea*
* Blackpoll Warbler X
*Dendroica striata*
* Prairie Warbler S
*Dendroica discolor*
Palm Warbler
*Dendroica palmarum*
* Ovenbird X
*Seiurus aurocapillus*
Northern Waterthrush pN
*Seiurus noveboracensis*
MacGillivray's Warbler N
*Oporornis tolmiei*
Common Yellowthroat N
*Geothlypis trichas*
Yellow-breasted Chat N
*Icteria virens*
* Hooded Warbler X
*Wilsonia citrina*
Wilson's Warbler N
*Wilsonia pusilla*
American Redstart N
*Setophaga ruticilla*

PLOCEIDAE

House Sparrow I
*Passer domesticus*

ICTERIDAE

Bobolink N
*Dolichonyx oryzivorus*
Western Meadowlark N
*Sturnella neglecta*
Yellow-headed Blackbird N
*Xanthocephalus xanthocephalus*
Red-winged Blackbird N
*Agelaius phoeniceus*
Tricolored Blackbird N
*Agelaius tricolor*
* Orchard Oriole X
*Icterus spurius*
* Hooded Oriole X
*Icterus cucullatus*
Northern Oriole N
*Icterus galbula*
* Rusty Blackbird X
*Euphagus carolinus*
Brewer's Blackbird N
*Euphagus cyanocephalus*
* Great-tailed Grackle X
*Quiscalus mexicanus*
* Common Grackle S
*Quiscalus quiscula*
Brown-headed Cowbird N
*Molothrus ater*

THRAUPIDAE

Western Tanager N
*Piranga ludoviciana*
* Scarlet Tanager X
*Piranga olivacea*
* Summer Tanager X
*Piranga rubra*

FRINGILLIDAE

Rose-breasted Grosbeak X
*Pheucticus ludovicianus*
Black-headed Grosbeak N
*Pheucticus melanocephalus*
* Blue Grosbeak X
*Guiraca caerulea*
* Indigo Bunting X
*Passerina cyanea*
Lazuli Bunting N
*Passerina amoena*
* Painted Bunting X
*Passerina ciris*
* Dickcissel X
*Spiza americana*
* Brambling X
*Fringilla montifringilla*
Evening Grosbeak N
*Hesperiphona vespertina*
Purple Finch N
*Carpodacus purpureus*
Cassin's Finch N
*Carpodacus cassinii*
House Finch N
*Carpodacus mexicanus*
Pine Grosbeak N
*Pinicola enucleator*
Gray-crowned Rosy Finch N
*Leucosticte tephrocotis*
Black Rosy Finch N
*Leucosticte atrata*
Common Redpoll X
*Carduelis flammea*
Pine Siskin N
*Carduelis pinus*
American Goldfinch N
*Carduelis tristis*
Lesser Goldfinch N
*Carduelis psaltria*
Red Crossbill N
*Loxia curvirostra*
White-winged Crossbill X
*Loxia leucoptera*
Green-tailed Towhee N
*Pipilo chlorurus*
Rufous-sided Towhee N
*Pipilo erythrophthalmus*
Brown Towhee N
*Pipilo fuscus*
* Lark Bunting X
*Calamospiza melanocorys*
Savannah Sparrow N
*Passerculus sandwichensis*
Grasshopper Sparrow N
*Ammodromus savannarum*
Vesper Sparrow N
*Pooecetes gramineus*
Lark Sparrow N
*Chondestes grammacus*
Black-throated Sparrow N
*Amphispiza bilineata*
Sage Sparrow N
*Amphispiza belli*
Dark-eyed Junco N
*Junco hyemalis*

Tree Sparrow
*Spizella arborea*
Chipping Sparrow N
*Spizella passerina*
• Clay-colored Sparrow X
*Spizella pallida*
Brewer's Sparrow N
*Spizella breweri*
• Black-chinned Sparrow X
*Spizella atrogularis*
Harris' Sparrow
*Zonotrichia querula*
White-crowned Sparrow N
*Zonotrichia leucophrys*
Golden-crowned Sparrow
*Zonotrichia atricapilla*
White-throated Sparrow
*Zonotrichia albicollis*
Fox Sparrow N
*Passerella iliaca*
Lincoln's Sparrow N
*Melospiza lincolnii*
• Swamp Sparrow X
*Melospiza georgiana*
Song Sparrow N
*Melospiza melodia*
• McCown's Longspur S
*Calcarius mccownii*
Lapland Longspur
*Calcarius lapponicus*
• Chestnut-collared Longspur X
*Calcarius ornatus*
Snow Bunting
*Plectrophenax nivalis*
• McKay's Bunting X
*Plectrophenax hyperboreus*

## ACKNOWLEDGMENTS

We wish to thank the other members of the Oregon Bird Records Committee, Alan Contreras, David Fix, Jeff Gilligan, David Irons, Larry McQueen, Eleanor Pugh and Steve Summers, all of whom critically reviewed the checklist and made suggestions for its improvement. We are especially indebted to the Committee Secretary, Clarice Watson, for her generous assistance and encouragement.

## LITERATURE CITED

American Ornithologists' Union. 1957. Check-list of North American birds. 5th ed. Am. Ornithol. Union. Baltimore, MD.

American Ornithologists' Union. 1962. Notes and news. Auk 79:493-494.

American Ornithologists' Union. 1973. Thirty-second supplement to the American Ornithologists' Union check-list of North American birds. Auk 90:411-419.

American Ornithologists' Union. 1976. Thirty-third supplement to the American Ornithologists' Union check-list of North American birds. Auk 93:875-879.

Gabrielson, I.N. & S.G. Jewett. 1940. Birds of Oregon. Oregon State College, Corvallis. Reprinted, 1970, under title Birds of the Northwest. Dover Publications, New York.

Jehl, J.R., Jr. 1968. Relationships in the Charadrii (shorebirds). Trans. San Diego Soc. Nat. Hist., Memoir 3.

*Accepted 9 November 1981*

# TIME OF DAY AND DESERT BIRD CENSUSES

WESLEY W. WEATHERS, Department of Avian Sciences, University of California, Davis, California 95616

WILBUR W. MAYHEW, Department of Biology, University of California, Riverside, California 92521

Many recent quantitative studies of avian population ecology have used strip transect methods to estimate bird densities (see Emlen 1971, 1977). These methods, and indeed all census methods, suffer from complications and limitations, some of which pertain to the observation conditions (e.g., weather and time of day). Traditionally the bias introduced by diurnal variations in bird detectability has been met by limiting censusing to early morning "when birds are most active" (Pettingill 1970). However, recent findings that detectability may vary inversely with time of day in winter, but directly with time of day in summer (Anderson and Ohmart 1977, Shields 1977), or in some species (Robbins 1981), emphasize the need for further studies.

Since 1978 we have been intensively censusing bird communities along a 2600-m altitudinal gradient in California's Santa Rosa Mountains, using the narrow strip transect method (Merikallio 1946, 1958). In order to sample all of our transects monthly, we have had to census at various times of day. Our early results suggested that, in the open desert habitats of our study region, time of day had little influence on census results, provided air temperature was below about 35 C. Indeed, midday censuses seemed to yield density estimates comparable to those obtained at sunrise. To examine this further, we censused two desert habitats ten times each, twice daily — once around sunrise and once at midday — between 25 March and 9 April 1980.

## MATERIALS AND METHODS

The two 50-m wide transects we censused are part of a series of 32 strip transects established at the University of California's Philip L. Boyd Deep Canyon Desert Research Center, located near Palm Desert, California. Both transects lie on an alluvial fan (elevation 250 m) that spreads northward from the base of the Santa Rosa Mountains (Figure 1). One transect (No. 8; desert woodland habitat) is 1.3 km long and follows the sandy bed of a dry desert wash. The dominant plants on this transect are Palo Verde (*Cercidium floridum*), Smoke Tree (*Dalea spinosa*), Desert-willow (*Chilopsis linearis*), Desert-lavender (*Hyptis emoryi*), Chuparosa (*Beloperone californica*) and Cheesebush (*Hymenoclea salsola*). The other transect (No. 1B; scrubland habitat), located to the west of transect 8, follows a paved one-lane road (3-m wide) for 1.5 km across the broad alluvial fan. Dominant plants on this transect include Creosote Bush (*Larrea tridentata*), Burrobush (*Ambrosia dumosa*), Sweet Bush (*Bebbia juncea*), Cheesebush and several species of cacti. A few scattered Palo Verde and Smoke Trees also occur on transect

1B. Plant cover averages approximately 14% on transect 1B and 23% on transect 8 (Zabriskie 1979 and pers. comm.).

Both transects were walked twice daily, once within 2 h of sunrise and again at midday (starting times relative to sunrise are given in Appendices 1 and 2). All transect counts were made by Weathers on calm sunny days. He used all available cues to detect birds and advanced with frequent pauses at speeds averaging 1.7 km/h. Following Emlen (1979), we assumed that in these open habitats few species would show detectability attenuation inside the 25-m boundary. Hence, no density adjustments were made for difficult to detect species.

## RESULTS

From the number of birds seen during sunrise and midday censuses (Appendices 1 and 2), we calculated species richness, mean number of species seen, density, and species diversity (Table 1). Significant diurnal differences in these measures of community structure existed only for the desert woodland habitat, in which density was lower and diversity higher at sunrise than at midday. In the more open scrubland habitat, midday and sunrise censuses were comparable. In both habitats a few species exhibited diurnal density changes (Appendices 1 and 2). Although some of these changes were due to variations in detectability, most seemingly resulted from localized

Table 1. Number of species, individuals, and diversity of birds in two desert habitats censused 10 times each at sunrise and midday.

| | Desert Woodland Habitat | | Scrubland Habitat | |
|---|---|---|---|---|
| | **Sunrise** | **Midday** | **Sunrise** | **Midday** |
| **Species richness**[a] | 25 (11) | 25 (11) | 18 (10) | 20 (10) |
| **Number species/census** | 11.90 ± 1.66 | 11.90 ± 1.45 | 8.20 ± 1.69 | 9.10 ± 1.60 |
| **Density (birds/40 ha)** | 594 ± 177[b] | 719 ± 149 | 236 ± 111 | 238 ± 94 |
| **Diversity†** | 0.85 ± 0.03[b] | 0.80 ± 0.05 | 0.72 ± 0.14 | 0.71 ± 0.09 |

Values are mean ± standard deviation.

†Simpson's index of diversity: $D = 1 - \sum_{i=1}^{s} (P_i)^2$.

[a]Total species (resident species).

[b]Significantly different from midday value ($p < 0.02$; paired $t$ statistic).

Figure 1. View of Deep Canyon study site, near Palm Desert, California. Location of the desert woodland transect (No. 8) is indicated by the dashed line. The solid line denotes the scrubland transect (No. 1B). Photograph taken from 1100-m elevation looking northeast.

movements by birds. For example, more Gambel's Quail were encountered in the scrubland habitat at sunrise than at midday, whereas the opposite was true for the desert woodland habitat. This circumstance was due to quail leaving their nighttime desert wash roosts at dawn and traveling across the scrubland transect to drink at a nearby stream. After drinking, they returned to the dry desert wash. Similar localized movements may be responsible for higher midday densities of two other desert woodland residents, the Mourning Dove and House Finch. Like the quail, these species require free water and probably left the transect early in the day to drink. Resident birds not dependent upon free water did not show significant diurnal variations in density.

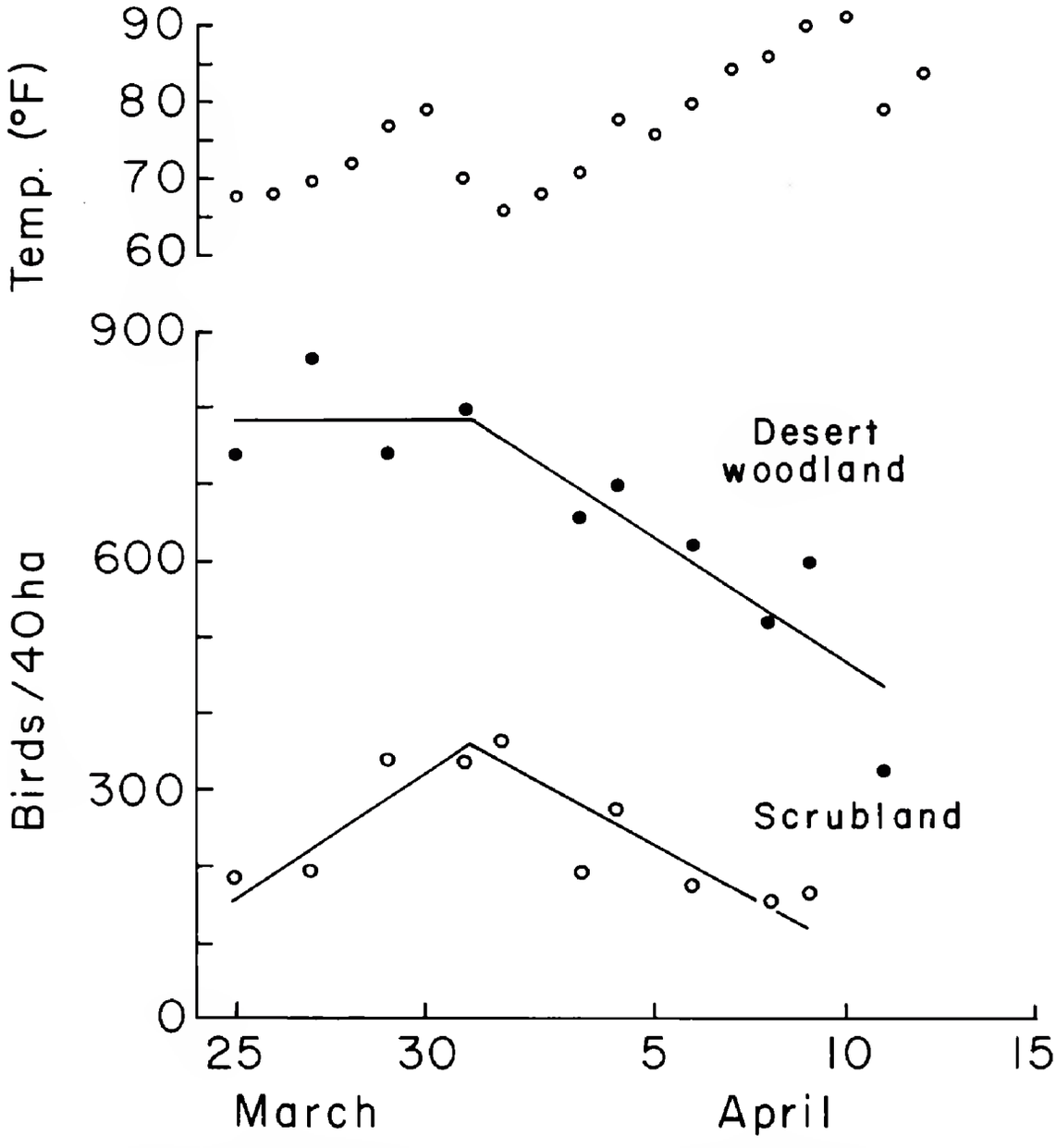



Figure 2. Maximum daily air temperature (above) and mean bird density in two desert habitats (below). Bird density was determined by averaging sunrise and midday transect counts.

In contrast with the pattern seen in resident species, winter visitors were more numerous in the desert woodland at sunrise than at midday. This resulted from greater numbers of sparrows being recorded at sunrise (Appendix 1). In the desert woodland, Brewer's, White-crowned and Golden-crowned sparrows tended to rest in dense bushes at midday and thus were less detectable at that time. Some White-crowned Sparrows probably left the desert wash for the scrubland habitat at midday, however, as their numbers increased there then.

During this study, bird density changed conspicuously with time of year (Fig. 2). In the desert woodland habitat, bird density decreased from around 800 to 330 birds/40 ha within 2 weeks. This decrease, which paralleled an increase in maximum air temperature, was due mainly to the emigration of winter visitors and House Finches. The early April peak in scrubland bird density resulted from beginning those censuses earlier in the day and consequently encountering more Gambel's Quail (Appendix 2). When Gambel's Quail are omitted from the calculations, scrubland bird density follows the desert woodland pattern.

## DISCUSSION

The belief that early morning is the best time of day to census birds is widespread. Empirical studies, however, have yielded conflicting results. In some studies (Dawson 1981, Skirven 1981), bird density was independent of time of day, whereas in others (e.g., Robbins and Van Velzen 1967, Järvinen et al. 1977) it decreased with time since sunrise. Although sunrise may be the best time to census densely vegetated habitats (i.e., those in which detecting birds depends heavily on sound cues), in more open habitats other times of day may be equally satisfactory. Indeed, we found that due to local bird movements, the relative density of birds in desert woodland was actually higher at midday than at sunrise (Table 1). If we had limited censuses in this habitat to around sunrise, bird density would have been underestimated by an average of 17%. In three species (Gambel's Quail, Mourning Dove and House Finch), the underestimation would have been closer to 100%. Clearly, one cannot assume *a priori* that sunrise censuses provide the best results in all habitats. Furthermore, in the absence of diurnal effects, limiting censusing to a single time of the day is unnecessary and inefficient.

### *Number of censuses required*

Often, bird community structure is expressed by density, species diversity, and species richness estimates derived from transect data. The number of times that a transect must be censused to obtain reliable estimates of these parameters is thus of crucial importance. Presumably, this will vary with habitat type and season. In mature Honey Mesquite (*Prosopis juliflora*), Anderson and Ohmart (1977) found that a minimum of four censuses of

single transects 0.8 to 1.6 km long was necessary to obtain reliable estimates of bird species diversity and richness, but that a single census was adequate for determining density. In the open desert habitats we studied, single censuses also provided reasonable estimates of density. Indeed, total bird density changed so rapidly throughout our study that calculating a mean density from multiple censuses seems inappropriate.

In Figure 3 we present mean density estimates based on our unpublished censuses of six different desert woodland transects (including data for transect 8). These data confirm the pattern seen in Figure 2, and indicate that during the breeding season density varies markedly. A similar seasonal pattern has been found for birds in a northern hardwood forest by Holmes and Sturges (1975). Likewise, Weber and Theberge (1977) found that bird density in southern Ontario, Canada, changed 53% in 7 weeks. Such rapid changes in bird density suggest that, for a variety of habitats, the precision of density estimates probably improves little after the first census.

Bird species diversity (calculated from the data in Appendices 1 and 2) shows greater variability in the scrubland than in the desert woodland habitat (Table 2). Consequently, whereas only two or three censuses are needed to adequately estimate diversity in the desert woodland, four or five are required in the scrubland.

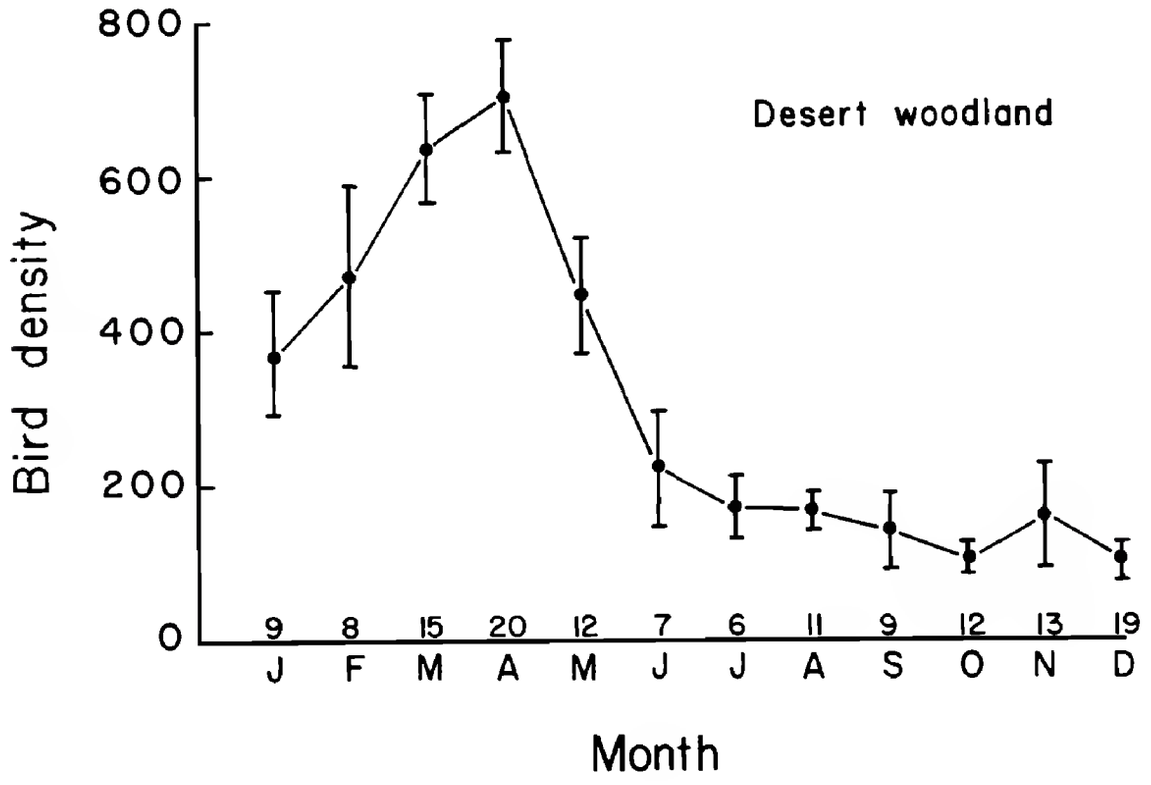



Figure 3. Seasonal change in total bird density (birds/40 ha) in desert woodland habitat at Deep Canyon Desert Research Center, Palm Desert, California. Values are means ± SE for the indicated number of transect counts. Data from six different transects.

Table 2. Bird species diversity (Simpson's Index) calculated from sunrise and midday census data.

| | Desert Woodland | | Scrubland | |
|---|---|---|---|---|
| **Census Number** | **Sunrise** | **Midday** | **Sunrise** | **Midday** |
| 1 | 0.86 | 0.72 | 0.77 | 0.75 |
| 2 | 0.86 | 0.81 | 0.82 | 0.70 |
| 3 | 0.78 | 0.78 | 0.65 | 0.67 |
| 4 | 0.83 | 0.70 | 0.49 | 0.60 |
| 5 | 0.85 | 0.80 | 0.50 | 0.59 |
| 6 | 0.89 | 0.80 | 0.82 | 0.65 |
| 7 | 0.87 | 0.82 | 0.83 | 0.73 |
| 8 | 0.86 | 0.87 | 0.74 | 0.85 |
| 9 | 0.83 | 0.83 | 0.88 | 0.85 |
| 10 | 0.90 | 0.83 | 0.74 | 0.74 |
| Mean ± SD | 0.85 ± 0.03 | †0.80 ± 0.05 | 0.72 ± 0.14 | 0.71 ± 0.09 |

†Significantly different from sunrise. $p < 0.01$ paired $t$ statistic.

Species richness, in terms of residents, changed by only one or two species after the fourth census in both habitats (Appendices 1 and 2). Based on more extensive censusing, however, we know that two species not detected during this study are resident in very low numbers in the desert woodland habitat: the Roadrunner, *Geococcyx californianus*, and Abert's Towhee, *Pipilo aberti*. Similarly, the Poor-will (*Phalaenoptilus nuttallii*) is a low density resident in the scrubland. Failure to detect these species during this study reflects their low density and patchy distributions, and, in the case of the Poor-will, nocturnal habits. This finding suggests that in these habitats several transects should be censused to estimate reliably species richness. Based on more extensive data, Anderson and Ohmart (1977) recommended censusing four different transects three times each to obtain adequate estimates of density, species diversity, and species richness in mature Honey Mesquite habitat. This recommendation seems reasonable for our more open habitats as well.

Because a multitude of factors affects bird census results (see Ralph and Scott 1981), our findings do not necessarily apply to other desert habitats. For example, in the Sonoran Desert, Grue et al. (1981) found bird density to be 32-49% lower at midday than at sunrise. Clearly, the prudent course is to assume that each situation is unique, and to determine empirically the best time of day to census birds.

## SUMMARY

In desert scrubland, sunrise and midday strip transect censuses produced comparable estimates of species diversity, species richness, and density. In desert woodland, species diversity averaged 6.3% higher and density 17.4% lower at sunrise than midday. Lower sunrise density in the desert woodland resulted from about half the resident Gambel's Quail, Mourning Doves and House Finches leaving this habitat at dawn to drink at nearby water sources. Thus, in our study area, restricting censusing to around sunrise is inappropriate in the desert woodland and unnecessary in the desert scrubland.

In the open desert habitats we studied, density was estimated adequately from a single census, but reliable estimates of species diversity and richness required 4-5 censuses.

## ACKNOWLEDGMENTS

We thank J. Michael Scott, Robert D. Ohmart and Charles van Riper III for critically reading the penultimate manuscript, and Debra L. Weathers for providing valuable technical assistance. Our research was supported by funds from the University of California Agricultural Experiment Station. This is contribution No. 2 from the University of California Natural Land and Water Reserve System.

## LITERATURE CITED

Anderson, B.W. & R.D. Ohmart. 1977. Climatologial and physical characteristics affecting avian population estimates in southwestern riparian communities using transect counts. U.S. For. Ser. Gen. Tech. Rep. RM-43:193-200.

Dawson, D.G. 1981. Counting birds for a relative measure (index) of diversity. Pp. 13-16 *in* C.J. Ralph & J.M. Scott, eds. Estimating the numbers of terrestrial birds. Studies in Avian Biol. No. 6.

Emlen, J.T. 1971. Population densities of birds derived from transect counts. Auk 88:323-342.

Emlen, J.T. 1977. Estimating breeding season bird densities from transect counts. Auk 94:455-468.

Emlen, J.T. 1979. Land bird densities on Baja California islands. Auk 96:152-167.

Grue, C.E., R.P. Balda & C.D. Johnson. 1981. Diurnal activity patterns and population estimates of breeding birds within a disturbed and undisturbed desert-scrub community. Pp. 287-291 *in* C.J. Ralph & J.M. Scott, eds. Estimating the numbers of terrestrial birds. Studies in Avian Biol. No. 6.

Holmes, R.T. & F.W. Sturges. 1975. Bird community dynamics and energetics in a northern hardwoods ecosystem. J. Anim. Ecol. 44:175-200.

Järvinen, O.R., A. Väisänen & Y. Haila. 1977. Bird census results in different years, stages of the breeding season, and times of the day. Ornis Fenn. 54:108-118.

Merikallio, E. 1946. Über regionale Verbreitung und Anzahl der Landvögel in Sud- und Mittelfinnland, besonders in deren Östlichen Teilen, im Lichte von quantitativen Untersuchungen. I. Allgmeiner Teil. Ann. Zool. Soc. Vanamo. 12:1-140.

Merikallio, E. 1958. Finnish birds. Their distribution and numbers. Fauna Fennica 5:1-181.

Pettingill, O.S., Jr. 1970. Ornithology in laboratory and field. Burgess Publ. Co., Minneapolis.

Ralph, C.J. & J.M. Scott. 1981. Estimating numbers of terrestrial birds. Studies in Avian Biol. No. 6.

Robbins, C.S. 1981. Effect of time of day on bird activity. Pp. 275-286 *in* C. J. Ralph & J.M. Scott, eds. Estimating the numbers of terrestrial birds. Studies in Avian Biol. No. 6.

Robbins, C.S. & W.T. Van Velzen. 1967. The breeding bird survey, 1966. U.S. Bur. Sport Fish. and Wildl., Spec. Sci. Rep. Wildl. 102.

Shields, W.M. 1977. The effect of time of day on avian census results. Auk 94:380-383.

Skirven, A.A. 1981. Effect of time of day and time of season on the number of observations and density estimates of breeding birds. Pp. 271-274 *in* C.J. Ralph & J.M. Scott, eds. Estimating the numbers of terrestrial birds. Studies in Avian Biol. No. 6.

Weber, W.C. & J.B. Theberge. 1977. Breeding bird survey counts as related to habitat and data. Wilson Bull. 89:543-561.

Zabriskie, J.G. 1979. Plants of Deep Canyon and the central Coachella Valley, California. Philip L. Boyd Deep Canyon Desert Res. Cent., Univ. California, Riverside.

APPENDIX 1. Number of birds recorded during sunrise and midday censuses in desert woodland habitat

| | Sunrise | | | | | | | | | | | Midday | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Census number** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{X}$(SD)* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{X}$(SD)* |
| **Start time (hrs. post sunrise)** | 0.3 | 1.0 | 1.3 | 1.0 | 0.3 | 0.0 | 0.5 | 0.2 | 1.3 | 0.3 | | 6.3 | 7.0 | 7.0 | 7.25 | 8.0 | 7.0 | 7.0 | 7.0 | 6.7 | 6.0 | |
| **Residents** | | | | | | | | | | | | | | | | | | | | | | |
| Cooper's Hawk<br>*Accipiter cooperii* | | | 1 | | | | | | | | 0.1 (0.32) | 1 | | | | | | | | | | 0.1 (0.32) |
| Gambel's Quail<br>*Lophortyx gambelii* | 3 | 3 | 1 | 2 | 7 | 10 | 5 | 13 | 4 | 4 | 5.2 (3.77) | 8 | 7 | 11 | 2 | 7 | 21 | 16 | 18 | 22 | 4 | †11.6 (7.17) |
| Mourning Dove<br>*Zenaida macroura* | 6 | 4 | 6 | 10 | 6 | 4 | 9 | 7 | 7 | 2 | 6.1 (2.38) | 4 | 9 | 9 | 12 | 14 | 13 | 14 | 14 | 10 | 19 | †11.8 (4.05) |
| Costa's Hummingbird<br>*Calypte costae* | 7 | 13 | 4 | 7 | 1 | 1 | 3 | 2 | 2 | 3 | 4.3 (3.74) | 11 | 4 | 5 | 3 | 5 | 5 | 1 | 2 | 1 | 4 | 4.1 (2.88) |
| Verdin<br>*Auriparus flaviceps* | 3 | 3 | 5 | 5 | 3 | 4 | 3 | 4 | 5 | 4 | 3.9 (0.88) | 2 | 1 | 2 | 1 | 3 | 4 | 3 | 5 | 3 | 4 | 2.8 (1.32) |
| Cactus Wren<br>*Campylorhynchus brunneicapillus* | | | | 3 | | 2 | | 2 | | 2 | 0.9 (1.20) | | | | | | | | 2 | | 2 | 0.4 (0.84) |
| Mockingbird<br>*Mimus polyglottos* | 1 | 5 | 1 | 1 | 1 | 1 | 2 | | | | 1.2 (1.48) | 1 | 11 | 2 | 2 | | | | | | 1 | 1.7 (3.37) |
| Black-tailed Gnatcatcher<br>*Polioptila melanura* | 4 | 3 | 1 | 3 | 2 | 1 | | | 2 | 1 | 1.7 (1.34) | 2 | 1 | 1 | 2 | | 1 | 1 | 1 | 2 | 1 | 1.2 (0.63) |
| Loggerhead Shrike<br>*Lanius ludovicianus* | 1 | 2 | | | 1 | | | 1 | | | 0.5 (0.71) | | 1 | | | 1 | 1 | 2 | 2 | 1 | | 0.8 (0.79) |
| House Finch<br>*Carpodacus mexicanus* | 30 | 32 | 40 | 40 | 18 | 13 | 16 | 7 | 27 | 5 | 22.8 (12.81) | 61 | 52 | 47 | 66 | 40 | 53 | 29 | 16 | 29 | 16 | †40.9 (17.84) |
| Black-throated Sparrow<br>*Amphispiza bilineata* | | | | | | | | | | 1 | 0.1 (0.32) | 1 | | | | | | | | | | 0.1 (0.32) |
| Total | 55 | 65 | 59 | 71 | 39 | 36 | 38 | 36 | 47 | 22 | 46.8 (15.35) | 91 | 86 | 77 | 88 | 70 | 98 | 66 | 60 | 68 | 51 | †75.5 (15.03) |

Appendix 1. (continued)

| | Desert woodland habitat | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sunrise | | | | | | | | | | | Midday | | | | | | | | | |
| Census number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{X}$(SD)* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{X}$(SD)* |
| Start time (hrs. post sunrise) | 0.3 | 1.0 | 1.3 | 1.0 | 0.3 | 0.0 | 0.5 | 0.2 | 1.3 | 0.3 | | 6.3 | 7.0 | 7.0 | 7.25 | 8.0 | 7.0 | 7.0 | 7.0 | 6.7 | 6.0 | |
| **Winter Visitors** | | | | | | | | | | | | | | | | | | | | | | |
| House Wren *Troglodytes aedon* | | | | | | | 1 | | | | 0.1 (0.32) | | | | | | | | | | | 0.0 (0.00) |
| Bewick's Wren *Thryomanes bewickii* | | 1 | | 2 | | 1 | | | 1 | | 0.5 (0.71) | | 2 | | 1 | | 1 | | | 2 | | 0.6 (0.84) |
| Ruby-crowned Kinglet *Regulus calendula* | | | | | | | 1 | | | | 0.1 (0.32) | | 1 | | | | | | | | | 0.1 (0.32) |
| Phainopepla *Phainopepla nitens* | 19 | 29 | 32 | 24 | 21 | 20 | 21 | 14 | 14 | 4 | 19.8 (7.97) | 15 | 28 | 23 | 18 | 19 | 23 | 25 | 14 | 16 | 2 | 18.3 (7.33) |
| Lesser Goldfinch *Carduelis psaltria* | | | | 1 | | | | | | | 0.1 (0.32) | 4 | | | 10 | | | | | | 1 | 1.5 (3.24) |
| Brewer's Sparrow *Spizella breweri* | | | | 2 | | | 2 | | | | 0.4 (0.84) | | | | | | | | | | | 0.0 (0.00) |
| White-crowned Sparrow *Zonotrichia leucophrys* | 12 | 12 | 18 | 7 | 23 | 9 | 13 | 13 | 14 | 3 | 12.4 (5.54) | | 6 | 1 | 3 | 8 | 7 | 3 | 7 | 6 | | †4.1 (3.07) |
| Golden-crowned Sparrow *Zonotrichia atricapilla* | 3 | | 1 | | | | | | | | 0.4 (0.97) | | 1 | | | | | | | | | 0.1 (0.32) |
| Total | 34 | 42 | 51 | 36 | 44 | 30 | 38 | 27 | 29 | 7 | 33.8 (11.98) | 19 | 38 | 24 | 32 | 27 | 31 | 28 | 21 | 24 | 3 | †24.7 (9.45) |
| **Migrants** | | | | | | | | | | | | | | | | | | | | | | |
| Western Flycatcher *Empidonax difficilis* | | | | | | | | | | | 0.0 (0.00) | | | | | | 1 | | | | | 0.1 (0.32) |
| Orange-crowned Warbler *Vermivora celata* | | 1 | 2 | | 2 | | 4 | | | | 0.9 (1.37) | | | | | | 1 | 1 | | | | 0.2 (0.42) |
| Black-headed Grosbeak *Pheucticus melanocephalus* | | | | | | | | | 1 | | 0.1 (0.32) | | | | | | | | | 1 | | 0.1 (0.32) |
| Total | | 1 | 2 | | 2 | | 4 | | 1 | | 1.0 (1.33) | | | | | | 2 | 1 | | 1 | | 0.4 (0.70) |

Appendix 1. (continued)

| | Desert woodland habitat | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sunrise | | | | | | | | | | | Midday | | | | | | | | | |
| **Census number** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{X}$(SD)* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{X}$(SD)* |
| **Start time (hrs. post sunrise)** | 0.3 | 1.0 | 1.3 | 1.0 | 0.3 | 0.0 | 0.5 | 0.2 | 1.3 | 0.3 | | 6.3 | 7.0 | 7.0 | 7.25 | 8.0 | 7.0 | 7.0 | 7.0 | 6.7 | 6.0 | |
| **Summer Visitors** | | | | | | | | | | | | | | | | | | | | | | |
| Ash-throated Flycatcher *Myiarchus cinerascens* | | | | | | | | | | 1 | 0.1 (0.32) | | | | | | | | | | 2 | 0.2 (0.63) |
| Violet-green Swallow *Tachycinetta thalassina* | | 1 | | | | | | | | | 0.1 (0.32) | | | | | 1 | | | | | | 0.1 (0.32) |
| Hooded Oriole *Icterus cucullatus* | | | | 1 | | | | | 1 | | 0.2 (0.42) | | | 1 | 1 | | | | 1 | | | 0.3 (0.48) |
| Scott's Oriole *Icterus parisorum* | 2 | 3 | | 1 | | | | | 1 | | 0.7 (1.06) | 5 | 3 | 2 | 3 | 1 | 3 | 1 | | | | †1.8 (1.69) |
| Northern Oriole *Icterus galbula* | | | | | | | | | | | 0.0 (0.00) | | 1 | | | | | | | 1 | | 0.2 (0.42) |
| Total | 2 | 4 | | 2 | | | | | 2 | 1 | 1.1 (1.37) | 5 | 4 | 3 | 4 | 2 | 3 | 1 | 1 | 1 | 2 | †2.6 (1.43) |
| **Unidentified birds** | | | | | | | | | | | | | | | | | | | | | | |
| Hummingbirds | 11 | 12 | 2 | 3 | 8 | 7 | 6 | 3 | 5 | 6 | 6.3 (3.33) | 9 | 6 | 7 | 4 | 4 | 1 | 4 | 10 | 4 | 7 | 5.6 (2.72) |
| Others (mainly sparrow size) | 7 | 7 | 3 | 12 | 6 | 8 | 4 | 2 | 3 | 2 | 5.4 (3.20) | | 11 | 6 | 2 | 7 | 8 | 7 | 5 | 6 | 2 | 5.4 (3.27) |
| Total | 18 | 19 | 5 | 15 | 14 | 15 | 10 | 5 | 8 | 8 | 11.7 (5.17) | 9 | 17 | 13 | 6 | 11 | 9 | 11 | 15 | 10 | 9 | 11.0 (3.23) |
| Total of all individuals | 109 | 131 | 117 | 124 | 99 | 81 | 90 | 68 | 87 | 38 | 94.4 (28.87) | 124 | 145 | 117 | 130 | 110 | 143 | 107 | 97 | 104 | 65 | †114.2 (23.62) |
| Total of all species | 12 | 14 | 12 | 15 | 11 | 11 | 12 | 9 | 12 | 11 | 11.9 (1.66) | 12 | 15 | 11 | 13 | 10 | 13 | 11 | 11 | 12 | 11 | 11.9 (1.45) |

*Values are mean (standard deviation). To convert to birds/40 ha multiply by 6.3.
†Significantly different from sunrise value $p<0.05$; paired *t* statistic

APPENDIX 2. Number of birds recorded during sunrise and midday censuses in desert scrubland habitat

| | Sunrise | | | | | | | | | | | Midday | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Census number** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{X}$(SD)* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{X}$(SD)* |
| **Start time (hrs. post sunrise)** | 1.5 | 2.0 | 0.6 | 0.0 | 0.0 | 1.25 | 1.0 | 1.5 | 1.5 | 0.3 | | 5.0 | 6.0 | 6.0 | 6.0 | 6.0 | 7.0 | 8.3 | 6.5 | 6.5 | 7.5 | |
| **Residents** | | | | | | | | | | | | | | | | | | | | | | |
| Gambel's Quail *Lophortyx gambelii* | 1 | | 12 | 50 | 60 | 12 | 11 | 3 | 4 | 18 | 17.1 (20.91) | 1 | | 4 | 1 | 1 | 5 | 7 | 7 | | | †2.6 (2.88) |
| Mourning Dove *Zenaida macroura* | | 1 | | | | 2 | | | | | 0.3 (0.67) | 3 | | | | | | | 1 | | | 0.4 (0.97) |
| Costa's Hummingbird *Calypte costae* | 2 | 1 | | 1 | 1 | | | 1 | 2 | 2 | 1.0 (0.82) | 1 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1.8 (0.63) |
| Say's Phoebe *Sayornis saya* | | | | | | | | | | | 0.0 (0.00) | | | 1 | | | | | | | | 0.1 (0.32) |
| Verdin *Auriparus flaviceps* | 1 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 1.7 (0.48) | | 3 | 2 | 2 | 3 | 2 | 3 | 1 | 1 | 2 | 1.9 (0.99) |
| Cactus Wren *Campylorhynchus brunneicapillus* | 2 | | | | 2 | 1 | 6 | 2 | 2 | 2 | 1.7 (1.77) | 2 | | | 1 | 1 | 1 | 3 | 4 | 2 | | 2.0 (1.15) |
| Mockingbird *Mimus polyglottos* | 1 | | | | | | 1 | | | | 0.2 (0.42) | | | | | | | | | | | 0.0 (0.00) |
| Black-tailed Gnatcatcher *Polioptila melanura* | | | | | | | | 1 | | 1 | 0.2 (0.42) | | | | 1 | | | | | | 1 | 0.2 (0.42) |
| Loggerhead Shrike *Lanius ludovicianus* | | | | | | 2 | 1 | 1 | 2 | | 0.6 (0.84) | | | | 1 | | | 1 | | 1 | | 0.3 (0.48) |
| House Finch *Carpodacus mexicanus* | 13 | 8 | 23 | 17 | 9 | 6 | 8 | 11 | 4 | 5 | 10.4 (5.89) | 17 | 23 | 41 | 30 | 31 | 19 | 29 | 8 | 7 | 9 | †21.4 (11.43) |
| Black-throated Sparrow *Amphispiza bilineata* | 1 | 1 | | | 3 | | 1 | | 3 | | 0.9 (1.20) | 2 | | 2 | 1 | | | 2 | 1 | 3 | | 1.1 (1.10) |
| Total | 21 | 13 | 37 | 70 | 76 | 25 | 30 | 20 | 19 | 30 | 34.1 (21.64) | 26 | 29 | 52 | 39 | 38 | 28 | 47 | 24 | 16 | 13 | 31.2 (12.67) |

Appendix 2. (continued)

| | Scrubland habitat | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sunrise | | | | | | | | | | | Midday | | | | | | | | | | |
| **Census number** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{X}$(SD)* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{X}$(SD)* |
| **Start time (hrs. post sunrise)** | 1.5 | 2.0 | 0.6 | 0.0 | 0.0 | 1.25 | 1.0 | 1.5 | 1.5 | 0.3 | | 5.0 | 6.0 | 6.0 | 6.0 | 6.0 | 7.0 | 8.3 | 6.5 | 6.5 | 7.5 | |
| **Winter Visitors** | | | | | | | | | | | | | | | | | | | | | | |
| Ruby-crowned Kinglet *Regulus calendula* | | | | | 3 | | | | | | 0.3 (0.95) | | | | | | | | | | | 0.0 (0.00) |
| Phainopepla *Phainopepla nitens* | 4 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 5 | 3.1 (0.88) | 4 | 5 | 4 | 2 | 3 | 2 | 2 | 3 | 3 | 6 | 3.4 (1.35) |
| Lesser Goldfinch *Carduelis psaltria* | | | | | | | 1 | | | | 0.1 (0.32) | 1 | | | | 1 | 1 | 2 | | 1 | | 0.6 (0.70) |
| Savannah Sparrow *Passerculus sandwichensis* | | | | | | | | | | | 0.0 (0.00) | | | | | 1 | | | | | | 0.1 (0.32) |
| Brewer's Sparrow *Spizella breweri* | | | | | | 1 | | | | | 0.1 (0.32) | | 1 | | | | | | 3 | | | 0.4 (0.97) |
| White-crowned Sparrow *Zonotrichia leucophrys* | | 6 | 5 | | 3 | 5 | 8 | 1 | 8 | 1 | 3.7 (3.13) | 3 | 6 | 21 | 7 | 1 | 2 | 3 | 9 | 1 | 1 | 5.4 (6.15) |
| Total | 4 | 9 | 8 | 3 | 8 | 9 | 12 | 4 | 10 | 6 | 7.3 (2.95) | 8 | 12 | 25 | 9 | 6 | 5 | 7 | 15 | 5 | 7 | 9.9 (6.17) |
| **Migrants** | | | | | | | | | | | | | | | | | | | | | | |
| Orange-crowned Warbler *Vermivora celata* | | | | | | | | | | | 0.0 (0.00) | | | | | 1 | | | | | | 0.1 (0.32) |
| Chipping Sparrow *Spizella passerina* | | | | | | 1 | | | | | 0.1 (0.32) | | | 3 | | 1 | | | | | | 0.4 (0.97) |
| Total | | | | | | 1 | | | | | 0.1 (0.32) | | | 3 | | 2 | | | | | | 0.5 (1.08) |

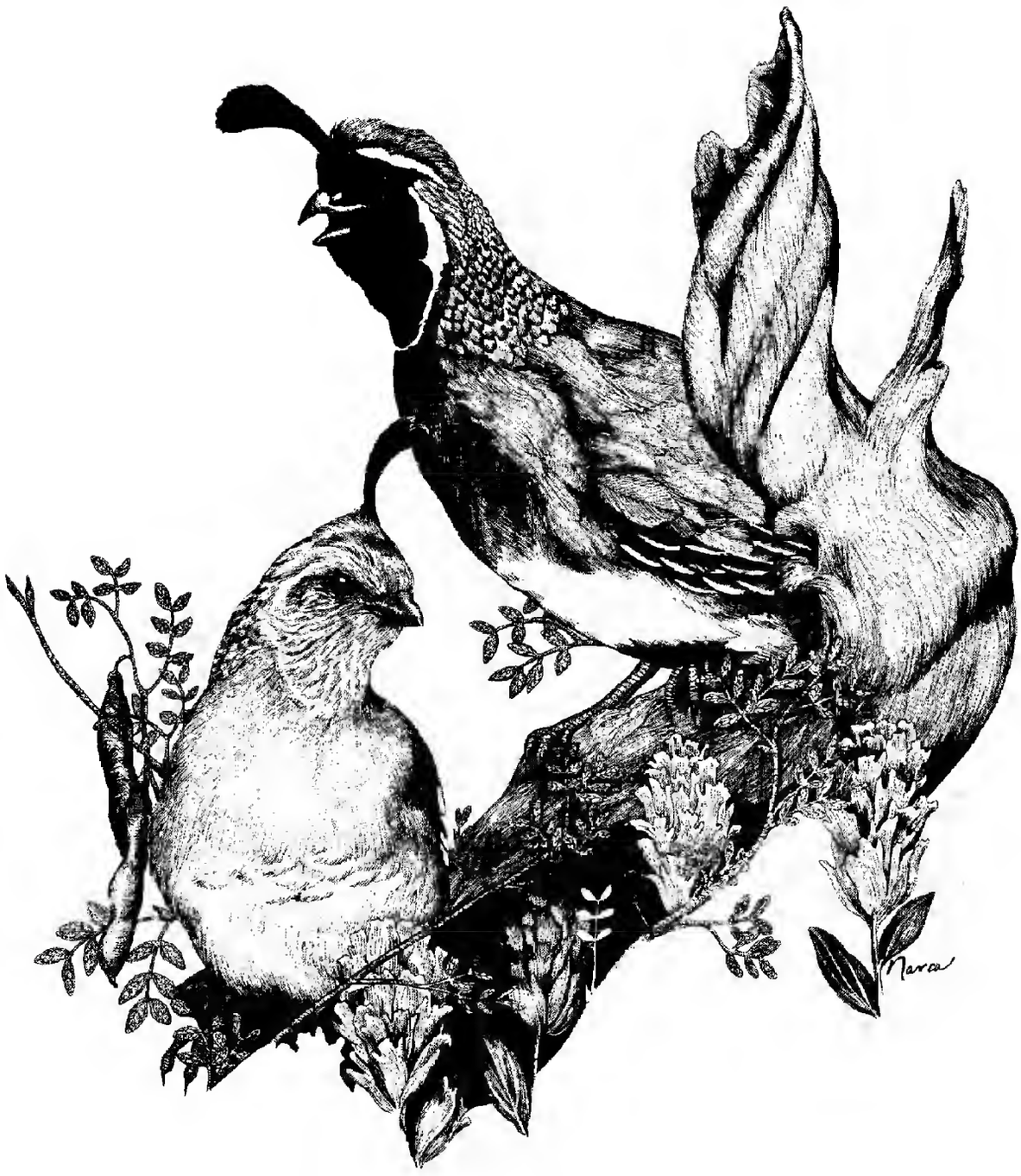
Appendix 2. (continued)

| | Scrubland habitat | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sunrise | | | | | | | | | | | Midday | | | | | | | | | | |
| **Census number** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{X}$(SD)* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | $\bar{X}$(SD)* |
| **Start time (hrs. post sunrise)** | 1.5 | 2.0 | 0.6 | 0.0 | 0.0 | 1.25 | 1.0 | 1.5 | 1.5 | 0.3 | | 5.0 | 6.0 | 6.0 | 6.0 | 6.0 | 7.0 | 8.3 | 6.5 | 6.5 | 7.5 | |
| **Summer Visitors** | | | | | | | | | | | | | | | | | | | | | | |
| Violet-green Swallow *Tachycinetta thalassina* | 3 | | | | | | | | | | 0.3 (0.95) | | | | | 2 | | | | | | 0.2 (0.63) |
| Hooded Oriole *Icterus cucullatus* | | | | | | | | | | | 0.0 (0.00) | | 1 | | | | | | | | | 0.1 (0.32) |
| Scott's Oriole *Icterus parisorum* | | | | | | | | | | | 0.0 (0.00) | | 1 | | | | | | | | | 0.1 (0.32) |
| Northern Oriole *Icterus galbula* | | | | 1 | | | | | | | 0.1 (0.32) | | | | | | | | | | | 0.0 (0.00) |
| Total | 3 | | | 1 | | | | | | | 0.4 (0.97) | | 2 | | | 2 | | | | | | 0.4 (0.84) |
| **Unidentified birds** | | | | | | | | | | | | | | | | | | | | | | |
| Hummingbirds | 1 | 1 | | | | | | | 1 | | 0.3 (0.48) | | 1 | 1 | 1 | 1 | | 2 | | | | 0.6 (0.70) |
| Others (mainly sparrow sized) | 1 | 4 | | 1 | 2 | 1 | | | 3 | 3 | 1.4 (1.51) | 3 | 1 | | | | 1 | 3 | 1 | 3 | 2 | 1.4 (1.26) |
| Total | 2 | 5 | | | 2 | 1 | | | 4 | 3 | 1.7 (1.83) | 3 | 2 | 1 | 1 | 1 | 1 | 5 | 1 | 3 | 2 | 2.0 (1.33) |
| Total of all individuals | 30 | 27 | 45 | 74 | 86 | 36 | 42 | 24 | 33 | 39 | 43.6 (20.45) | 37 | 45 | 81 | 49 | 49 | 34 | 59 | 40 | 24 | 22 | 44.0 (17.30) |
| Total of all species | 9 | 7 | 5 | 6 | 9 | 10 | 10 | 9 | 9 | 8 | 8.2 (1.69) | 9 | 8 | 9 | 10 | 12 | 8 | 10 | 10 | 9 | 6 | 9.1 (1.60) |

*Values are mean (standard deviation). To convert to birds/40 ha multiply by 6.3.
†Significantly different from sunrise value $p<0.05$; paired *t* statistic.



*Accepted 5 February 1982*




Gambel's Quail

*Sketch by Narca Moore*

# PHENOLOGY AND STATUS OF THE SHOREBIRDS IN NORTHERN UTAH

TEX A. SORDAHL, Department of Biology and the Ecology Center, Utah State University, Logan, Utah 84322 (current address: Department of Biology, Luther College, Decorah, Iowa 52101)

Although the marshes associated with Bear Lake, the Bear River and the Great Salt Lake are noted for providing habitat for large concentrations of waterbirds, the status of the shorebirds (Charadrii) has not been well-documented in northern Utah. Because of their location in the arid Great Basin, these extensive marshes may be a critical staging area for many migratory shorebirds; in addition, they support substantial breeding populations of several species. As human demand for the limited water resource increases, information about the seasonal use of the wetlands by shorebirds becomes more urgent for consideration in water management decisions. This paper presents new information on the phenology of migration and nesting, and on the numerical status, of shorebirds in northern Utah.

In connection with their work on the birds of Utah, Behle and Perry (1975) summarized the status of shorebirds based on published and unpublished records from 1852 to 1 October 1974, and Hayward et al. (1976) similarly provided another review. I began making observations on shorebirds in northern Utah (in Cache Valley and at the Bear River Migratory Bird Refuge) in the fall of 1973. From that time through spring 1980, while conducting behavioral research on Willets, American Avocets and Black-necked Stilts, I kept notes on the species and numbers of shorebirds present during my field work. I have records for 375 days, the majority of which are from 1975, 1977 and 1978. A few of these records have been reported as sightings in *American Birds*.

Unless otherwise indicated, all records reported here are from the Barrens, near Amalga, Cache County, Utah. The Barrens consists of shallow ponds and channels with extensive salt flats and mud flats. Its vegetation is mostly desert saltgrass (*Distichlis stricta*) and samphire (*Salicornia spp.*). The Barrens is approximately 205 ha in size. Thus the numerical data given convey a rough idea of shorebird densities; however, the breeding densities of Willets and Long-billed Curlews cannot be gauged in this way because they nested in surrounding agricultural fields. All records presented in this paper are based on direct personal observations, unless otherwise noted. Thus in some cases the span of dates given for copulations, nests with eggs, hatching, or flightless young could be extended further by calculations employing literature values for incubation period or fledging age.

I recorded 32 shorebird species at the Barrens. Of these, 8 nest there: American Avocet, Black-necked Stilt, Killdeer, Snowy Plover, Common Snipe, Long-billed Curlew, Willet and Wilson's Phalarope. A ninth species, the Spotted Sandpiper, may occasionally breed at the Barrens. Behle and Perry (1975) listed 37 shorebird species for the state. Of those, I did not observe 6 species: Black Oystercatcher (*Haematopus bachmani*), Mountain Plover (*Charadrius montanus*), Bar-tailed Godwit (*Limosa lapponica*),

Upland Sandpiper (*Bartramia longicauda*), Wandering Tattler (*Heteroscelus incanus*) and Red Phalarope (*Phalaropus fulicarius*). I recorded one species (Curlew Sandpiper) that is not on their list (but see species account below).

The records presented here extend the dates of occurrence listed by Behle and Perry (1975) for 14 species; these species are indicated by an asterisk (*). Some of these may winter in small numbers in the southern part of the state (Behle and Perry 1975, Hayward et al. 1976). Although I did not examine the relationship critically, it appeared that more migrants were present and more sightings of uncommon species were made under certain meteorological conditions — especially low, heavy cloud cover associated with precipitation (see also Beason 1978). I have attempted to follow the conventions used by Behle and Perry (1975:4-5) for seasonal status and relative abundance. Five species are given status or abundance designations that differ from those of Behle and Perry (1975); these species are indicated by a double asterisk (**).

## RECURVIROSTRIDAE

AMERICAN AVOCET, *Recurvirostra americana*. Common summer resident. Present 24 March-27 October, with a maximum of 361 recorded during spring migration, and an estimated breeding population of 85 pairs.

Copulations observed 24 March-23 June. Nests with eggs 14 April-18 July. Hatching 17 May-18 July. Latest clutch initiation 22 June. Flightless young until 15 August. By 13 June many birds start to molt into gray head of basic plumage, beginning around the eyes and on the forehead; replacement of remiges also begins by mid-June for many individuals.

BLACK-NECKED STILT, *Himantopus mexicanus*. Common summer resident. Present 27 March-6 October, with a maximum of 85 recorded during spring migration, and an estimated breeding population of 25 pairs.

Copulations observed 11 April-6 June. Nests with eggs 23 April-10 July. Hatching 20 May-6 July. Latest clutch initiation 9 June. Flightless young until 5 August. Molting of remiges begins in mid-June for many individuals.

## CHARADRIIDAE

*SEMIPALMATED PLOVER. *Charadrius semipalmatus*. Uncommon transient. Spring occurrence 21 April-31 May; maximum number recorded, 30. Autumn occurrence 16 July-4 September; maximum number recorded, 6.

KILLDEER, *Charadrius vociferus*. Common summer resident; a few can be seen in parts of Cache County throughout the winter (J.T. Mundahl pers. comm.) and may be permanent residents, but none are present at the Barrens in winter. Present at the Barrens 19 March-13 October. Maximum of 150 recorded in late March. Estimated breeding population of 20 pairs.

Combining my observations at the Barrens with those of J.T. Mundahl (pers. comm.) elsewhere in Cache County provides the following information on breeding phenology. Migrants arrive about the first week of March. Copulations observed 6 March-2 July. Nests with eggs 29 March-15 July. Flightless young 4 May-3 August. Some flocking apparent in late June.

*SNOWY PLOVER, *Charadrius alexandrinus*. Uncommon summer resident. Present 27 March-3 September. Maximum of 20 recorded in mid-April. Estimated breeding population of 5-8 pairs.

Nests with eggs 23 May-1 June. Flightless young 28 June-6 August.

American Avocet on nest, May 1979, Utah. *Photo by Tom Bledsoe*

*LESSER GOLDEN PLOVER, *Pluvialis dominica*. Uncommon transient. Three spring sightings — one bird in basic plumage on 7 April 1979, one bird in alternate plumage on 20 May 1978, and one bird in basic plumage (but with a few black breast feathers) on 20 June 1977. Three fall sightings of 3 birds in basic plumage, 23 September-6 October 1978; probably the same individuals each day.

**BLACK-BELLIED PLOVER, *Pluvialis squatarola*. Uncommon transient. Approximately as common as Semipalmated Plover, but more common than Lesser Golden Plover. Spring occurrence 23 April-25 May, with a maximum of 8 recorded; 10:1 ratio of alternate:basic plumage. Fall occurrence 7 August-28 September, with a maximum of 11 recorded; 10:1 ratio of basic:alternate plumage.

SCOLOPACIDAE
Calidridinae

RED KNOT, *Calidris canutus*. Rare transient. Two spring records — one bird in alternate plumage on 5 May 1975, and a flock of 4 birds in alternate plumage on 6 and 7 May 1978. One fall record — a bird in basic plumage (but with some rusty color on the breast) on 14 July 1975. Behle and Perry (1975) cited 2 specimens for the state, taken at the Bear River Migratory Bird Refuge in July 1948 and at St. George on 12 September 1965; they also listed sight records in northern Utah on 8 May 1954, 11 May 1968 and 10 May 1973. Hayward et al. (1976) noted one additional specimen, collected in Box Elder County in May 1933.

*SANDERLING, *Calidris alba*. Uncommon transient. Spring occurrence 27 April-25 May; maximum number recorded, 12. One early fall record, of several birds on 25 July 1975. Most spring birds were in pre-alternate molt, with two-thirds of them being in predominantly basic plumage.

SEMIPALMATED SANDPIPER, *Calidris pusilla*. Probably rare transient. Status is uncertain because of the difficulty of distinguishing *C. pusilla* from the more common *C. mauri* in the field (Phillips 1975, Prater et al. 1977), especially in the fall (Ouellet et al. 1973). On three occasions I saw one or more birds at extremely close range that I identified as *C. pusilla* — 28 April 1975, 4 May 1977 and 8 May 1979. Behle and Perry (1975) cited two spring sight records from Utah, on 6 May 1945 and 7 May 1967. Hayward et al. (1976) reported a total of 4 Utah specimens, taken in September 1872, 13 June 1936 and 7 September 1965.

*WESTERN SANDPIPER, *Calidris mauri*. Common transient. Spring occurrence 3 April-17 May, but sightings of *Calidris* sp. on 29 March and 8 June 1978 were probably of this species; maximum number recorded, 30. Autumn occurrence 25 June-20 September; maximum number recorded, 287.

*LEAST SANDPIPER, *Calidris minutilla*. Common transient. Spring occurrence 7 April-22 May; maximum number recorded, 100. Autumn occurrence 3 July-6 October; maximum number recorded, 22.

*BAIRD'S SANDPIPER, *Calidris bairdii*. Uncommon transient. Spring occurrence 5 April-18 April, but probable sighting on 27 March 1978; maximum number recorded, 2. Autumn occurrence 3 July-6 October; maximum number recorded, 20. More common in fall. I did not attempt to age fall birds (see Jehl 1979).

PECTORAL SANDPIPER, *Calidris melanotos*. Uncommon transient. Spring occurrence 3 April-4 May, based on three records; maximum number recorded, 2. Autumn occurrence 3 September-6 October; maximum number recorded, 67.

**CURLEW SANDPIPER, *Calidris ferruginea*. Hypothetical. One sight record of a bird in basic plumage on 6 and 7 August 1978 (Sordahl 1978) has been disputed (Am. Birds 33:220-221, 1979).

*DUNLIN, *Calidris alpina*. Uncommon transient. Spring occurrence 22 April-2 June; maximum number recorded, 7. All birds seen were in alternate plumage. No fall records.

**STILT SANDPIPER, *Micropalama himantopus*. Rare transient. Spring occurrence 3 May-4 June, based on eight records of at least 6 individuals. One seen 3 May 1976; 2 in alternate plumage seen 25 May 1977; 1 seen 29 May 1977; 1 seen 4 June 1977; 1 in alternate plumage seen 14 May 1978; 2 in alternate plumage seen 29 May 1978; 1 in alternate plumage seen 19 May 1979; 1 seen 21 May 1979. Behle and Perry (1975) reported one spring sight record from southern Utah on 15 May 1965, and Hayward et al. (1976) reported a Utah specimen in pre-alternate molt taken in April 1893.

One autumn record, of a bird in pre-basic molt on 16 August 1978. Behle and Perry (1975) reported two fall sight records for northern Utah, on 26 July 1932 and 5 September 1968.

Gallinagininae

COMMON SNIPE, *Capella gallinago*. Common summer resident; winters in some parts of Cache County, at least during some years, but not at the Barrens. Occurrence at the Barrens 25 March-14 September. Flocks of ca. 20 birds seen nearby in late February. Winnowing at the Barrens 29 March-19 April. Estimated breeding population of 5 pairs.

Winegardner (1976) reported the following on breeding schedule in Cache County: winnowing 16 March-20 July; pair formation begins ca. 1 April; establishment of territories 1-15 April; territories, usually ca. 9 ha, occupied continually until about 15 June.

SHORT-BILLED DOWITCHER, *Limnodromus griseus*. Uncommon transient. Because of time constraints and the difficulty of distinguishing the two species of *Limnodromus*, I usually recorded the number of birds under the inclusive heading "dowitchers." See *L. scolopaceus*.

*LONG-BILLED DOWITCHER, *Limnodromus scolopaceus*. Common transient. Spring occurrence 26 March-8 June; maximum number recorded, 250. Autumn occurrence 8 July-6 October; maximum number recorded, 308.

Tringinae

**HUDSONIAN GODWIT, *Limosa haemastica*. Occasional. Two birds in alternate plumage 5 June 1976. Behle and Perry (1975) cited one sight record of 6 birds at Cedar City, Iron County, on 28 April 1968.

Because mine is only the second state record for this species, and the first for northern Utah, it is appropriate to provide details of the sighting. Using 7 x 35 binoculars I observed the 2 birds from 1600-1800 at distances of 40 to 100 m. It was sunny and clear, and the sun was behind me. The birds stood quietly, preened, and once flew in a wide semi-circle before landing nearby. Their long bills were light-colored at the base and slightly upturned, but the birds were distinctly smaller and much more reddish on the underparts than Marbled Godwits, which I never recorded at the Barrens later than 14 May; the latest spring date given by Behle and Perry (1975) for Marbled Godwits in Utah is 26 May. The reddish color of the underparts extended to the belly and undertail coverts, and was marked by dark bars. Both while preening and in flight the birds exhibited a dorsal white wing stripe and a black tail with white at its base. The black on the tail formed a terminal band which was sharply delineated from the white at the base of the tail. Identification of this species in alternate plumage is not difficult; the field marks noted above distinguish the Hudsonian Godwit from all species with which

it might conceivably be confused, including the Long-billed Dowitcher, Marbled and Bar-tailed godwits, Willet, and even the Palearctic Black-tailed Godwit (*Limosa limosa*).

*MARBLED GODWIT, *Limosa fedoa*. Common transient. Spring occurrence 22 April-14 May; maximum number recorded, 50. D.M. Forsythe (pers. comm.) recorded spring arrival in Cache County on 20 April 1967. Autumn occurrence 23 June-3 September; maximum number recorded, 68.

WHIMBREL, *Numenius phaeopus*. Rare transient. Three spring records — 3 birds on 18 April 1977, 1 on 15 May 1977, and 1 on 11 May 1978. D.M. Forsythe saw 1 in Cache County on 7 May 1965 (Hayward et al. 1976). Several previous records for Utah span the dates 22 March-14 June, and include one fall record for 27 August (Behle and Perry 1975).

**LONG-BILLED CURLEW, *Numenius americanus*. Common summer resident. Present 29 March-15 August, with a maximum of 70 recorded during fall migration, and an estimated breeding population of 5-10 pairs in fields surrounding the Barrens. Nests with eggs 4-25 May. Flightless young 2-20 June. Last birds seen in fall are young-of-the-year.

D.M. Forsythe (pers. comm.) recorded spring arrival in Cache County on 22 March 1968. Two nests in Cache County were active from at least 3 May to 23 May, when hatching occurred at one nest (Forsythe 1972). For inferences about the phenology of the population, see Forsythe (1970:214).

*GREATER YELLOWLEGS, *Tringa melanoleuca*. Common transient. Spring occurrence 24 March-8 May; maximum number recorded, 40. Autumn occurrence 13 June-6 October; maximum number recorded, 9.

*LESSER YELLOWLEGS, *Tringa flavipes*. Common transient. Spring occurrence 1 April-26 May; maximum number recorded, 90. Autumn occurrence 24 June-6 October; maximum number recorded, 40. Several observers found 1 or 2 individuals in Cache County 11 January-14 February 1981 (Am. Birds 35:322, 1981).

SOLITARY SANDPIPER, *Tringa solitaria*. Uncommon transient. Spring occurrence 6-11 May, based on five sightings of at least 2 individuals. A specimen was taken in Cache County on 28 April 1937 (Hayward et al. 1976). Autumn occurrence 29 July-9 September, based on seven sightings of at least 8 individuals; maximum number recorded, 3.

The notion that this species may nest in Utah (Hayward et al. 1976) is almost certainly erroneous (see Palmer 1967).

SPOTTED SANDPIPER, *Actitis macularia*. Common summer resident in northern Utah, but uncommon at the Barrens. Most commonly seen in northern Utah around alpine lakes and impoundments of mountain streams. Habitat at the Barrens apparently is not preferred for nesting, although similar habitat at the Bear River Migratory Bird Refuge supports a small breeding population (pers. obs.; some young fledge by mid-June). A maximum of 4 birds was recorded in a single census at the Barrens. Song-flights and courtship behavior were observed in mid-June 1978, but nesting was not confirmed. Recorded dates of occurrence, 14 May-28 June and 19 July-3 September, suggest that the small numbers of Spotted Sandpipers seen at the Barrens are transients there.

**WILLET, *Catoptrophorus semipalmatus*. Common summer resident. Present 1 April-9 September, with a maximum of 127 recorded during fall migration, and an estimated breeding population of 10-15 pairs in fields surrounding the Barrens.

Copulations observed 19 April-3 June. Nests with eggs 1 May-18 June. Flightless young 25 May-10 July, and fledged young by 19 June. Last birds seen in fall are

young-of-the-year. Most birds have departed by mid-August. For inferences about the phenology of the population, see Sordahl (1979:552).

Arenariinae

RUDDY TURNSTONE, *Arenaria interpres*. Occasional. One in alternate plumage seen on 5 June 1976. Previous Utah records are all from the northern part of the state. Behle and Perry (1975) reported 1 specimen taken on 4 August 1930 in Box Elder County, and sight records on 3 June 1944, 29 April 1962 and 24 August 1973. Hayward et al. (1976) reported three additional sight records, all from Box Elder County: 2 birds in late May 1932; 3 birds in alternate plumage on 17 May 1933; and 1 bird on 28 May 1944.

Phalaropodinae

*WILSON'S PHALAROPE, *Phalaropus tricolor*. Common summer resident. Present 21 April-3 September (1 very early female just beginning the pre-alternate molt was present for 1 day, 26 March 1978). Maximum of 579 recorded during fall migration; maximum spring numbers, ca. 300. Estimated breeding population of 70-80 pairs.

Early spring sex ratio favors females. Spring birds are in alternate plumage; autumn birds are in pre-basic molt, and most are in predominantly basic plumage.

Copulations observed late April. Nests with eggs 18 May-8 June. Flightless young 16-26 June. Flocking prior to fall migration is noticeable by the 4th week of June.

*NORTHERN PHALAROPE, *Phalaropus lobatus*. Common transient, but less common than *P. tricolor*. Spring occurrence 28 April-25 May; maximum number recorded, 100. Autumn occurrence 2 July-6 October; maximum number recorded, 280. Spring birds are in alternate plumage; autumn birds are in pre-basic molt, and most have nearly completed it.

## ACKNOWLEDGMENTS

I am grateful to Jack B. Parson and other members of the Barrens Company Hunting Club for permitting me to conduct research on their land. My research was supported by a Utah State University Research Fellowship and by grants from the Frank M. Chapman Memorial Fund of the American Museum of Natural History and from Sigma Xi, The Scientific Research Society.

I thank Keith L. Dixon and William H. Behle for helpful suggestions on the manuscript, and John T. Mundahl for sharing his Killdeer observations.

## LITERATURE CITED

Beason, R.C. 1978. The influences of weather and topography on water bird migration in the southwestern United States. Oecologia (Berl.) 32:153-169.

Behle, W.H. & M.L. Perry. 1975. Utah birds: check-list, seasonal and ecological occurrence charts and guides to bird finding. Utah Mus. Nat. Hist., Salt Lake City.

Forsythe, D.M. 1970. Vocalizations of the Long-billed Curlew. Condor 72:213-224.

Forsythe, D.M. 1972. Observations on the nesting biology of the Long-billed Curlew. Great Basin Nat. 32:88-90.

Hayward, C.L., C. Cottam, A.M. Woodbury & H.H. Frost. 1976. Birds of Utah. Great Basin Nat. Mem. 1:1-229.

Jehl, J.R., Jr. 1979. The autumnal migration of Baird's Sandpiper. Pp. 55-68 *in* F.A. Pitelka, ed. Shorebirds in marine environments. Studies in Avian Biol. No. 2.

Ouellet, H., R. McNeil & J. Burton. 1973. The Western Sandpiper in Quebec and the Maritime Provinces, Canada. Can. Field-Nat. 87:291-300.

Palmer, R.S. 1967. Plumage descriptions, and species accounts. *In* G.D. Stout, ed. The shorebirds of North America. Viking Press, New York.

Phillips, A.R. 1975. Semipalmated Sandpiper: identification, migrations, summer and winter ranges. Am. Birds 29:799-806.

Prater, A.J., J.H. Marchant & J. Vuorinen. 1977. Guide to the identification and ageing of Holarctic waders. British Trust for Ornithology Field Guide 17:1-168.

Sordahl, T.A. 1978. First record of the Curlew Sandpiper (*Calidris ferruginea*) in Utah, with comments on its occurrence in North America. Am. Birds 32:1065-1068.

Sordahl, T.A. 1979. Vocalizations and behavior of the Willet. Wilson Bull. 91:551-574.

Winegardner, S.C. 1976. Ecology of the Common Snipe in northern Utah. MS thesis, Utah State Univ., Logan.

*Accepted 26 December 1981*

Willet, June 1979, Utah.

*Photo by Tom Bledsoe*

# NOTES

## A SANDWICH TERN IN CALIFORNIA

FRED C. SCHAFFNER, Department of Zoology, San Diego State University, San Diego, California 92182

For at least 9 days during May 1980 a Sandwich Tern (*Sterna sandvicensis*) was present near Imperial Beach, San Diego Co., California. All sightings were made at the Elegant Tern (*S. elegans*) breeding colony located in the saltworks at the south end of San Diego Bay. I first saw the Sandwich Tern the afternoon of 11 May with a group of about 150 Elegant Terns, 50 Forster's Terns (*S. forsteri*) and 6 Least Terns (*S. albifrons*) which were foraging in an outer evaporating pond on numerous small (2-10 cm) fishes, mostly Topsmelt (*Atherinops affinis*) and Longjaw Mudsuckers (*Gillichthys mirabilis*).

The Sandwich Tern periodically landed on the dike with the largest Elegant Tern breeding group, carrying a fish in its bill, and attempted to stand among the incubating birds or with other small groups of Elegant Terns on the dike. The Elegant Terns never allowed the Sandwich Tern the same proximity as other Elegant Terns and consistently drove it off if it approached closer than about 0.5 m. It went from group to group, and several times after being driven off it swallowed its fish, flew off to catch another, and tried again. After about 45 minutes the bird left the saltworks and headed out towards the bay.

Hoping to see the tern again when it came to roost, I returned to the same spot that evening. About 1815 it reappeared. The scenario was much as before and I observed the bird until dusk.

The Sandwich Tern was next seen the morning of 13 May by Michael Evans and myself. Shortly past 0900 we observed the bird making fish offering displays to individual Elegant Terns in a manner generally similar to that of male Elegant Terns. The Sandwich Tern would approach an Elegant Tern obliquely or perpendicularly in an upright posture with a small fish held crosswise in its bill. The Sandwich Tern's wings were held out from the body at the carpal joints, with the primaries slightly drooped. The crest was held erect, the neck vertical and the head horizontal, with the bill nearly parallel to the ground. The tail angled down at the tip but would occasionally raise to approximately horizontal as the tern made distinct vertical flicking motions with its bill. The stance would change to nearly parallel to and slightly behind the Elegant Tern to which the Sandwich Tern was offering as the Elegant Tern rejected the offering and walked away. If the Sandwich Tern persisted in offering and followed the Elegant Tern, the Elegant Tern would drive it off with the bill using a threat gaping posture typical of many tern species. We observed this behavior nearly 40 minutes until the tern flew out of sight.

The bird was also seen at about noon on 13 May by Guy McCaskie and again that evening by McCaskie, Elizabeth Copper and Jon Dunn. As far as is known, the last sighting was made the morning of 20 May when I saw the bird standing on the dike about 2 m from a group of six Elegant Terns. Within just a few minutes it flew off and was not seen again.

A description of the tern by another observer is on file with the California Bird Records Committee and the record, the first for California, has been accepted by the committee.

The Sandwich Tern (with its subspecies *sandvicensis*, *acuflavida* and *eurygnatha*) has a wide distribution, breeding at the Black and Caspian seas in western Asia, locally from northern Europe to North Africa, along the southern United States coast from Virginia to Texas, the Caribbean coast of Mexico, the Bahamas, Curaçao and the Atlantic coast of South America south to Argentina. Beyond its typical breeding range the Sandwich Tern winters commonly in North Africa (although it is rarer towards eastern North Africa; Etchecopar and Hue 1964), West Africa (Brown 1979), south to South Africa and across the Indian Ocean very spottily to northwest India. In the western hemisphere beyond its typical breeding range the Sandwich Tern winters along the Caribbean coast of Central America and Colombia and in the Pacific from Tehuantepec, Oaxaca, Mexico (Peterson and Chalif 1973) south to Peru (Junge and Voous 1955, Meyer de Schauensee 1966, Blake 1977).

It should be noted that the San Diego saltworks were also visited by a few Royal Terns (*S. maxima*). Buckley and Buckley (1972) indicate that the Sandwich Tern often associates closely with the Royal Tern, a species which shares much of the Sandwich Tern's African and Neotropical distributions. Like the Elegant Tern and often associated *with* Elegant Terns, the Royal Tern can be seen at various times of the year from Peru (Ashmole and Tovar-S. 1968) north along the Pacific coast and Gulf of California to San Francisco, California (Cogswell 1977).

Thus, the three tern species (Elegant, Royal and Sandwich) occur together at least casually on the Pacific coast from Peru north to Central America (Blake 1977) giving Sandwich Terns ample opportunity to come in contact with Elegant and Royal terns. Considering that all three species are highly social, one could conclude that the Sandwich Tern in San Diego had become disoriented during the spring migration and followed the next most similar species, Elegant and Royal terns.

## LITERATURE CITED

Ashmole, N.P. & H. Tovar-S. 1968. Prolonged parental care in Royal Terns and other birds. Auk 85:90-100.

Blake, E.R. 1977. Manual of neotropical birds. Univ. Chicago Press. Chicago & London.

Brown, R.G.B. 1979. Seabirds of the Senegal upwelling and adjacent waters. Ibis 121:283-293.

Buckley, P.A. & F.G. Buckley. 1972. The breeding ecology of Royal Terns *Sterna (Thalasseus) maxima maxima*. Ibis 114:344-359.

Cogswell, H.L 1977. Waterbirds of California. Univ. California Press, Los Angeles.

Etchecopar, R.D. & F. Hue. 1964. Les oiseaux du Nord de l'Afrique. Editions N. Boubee & Cie, Paris.

Junge, G.C.A. & K.H. Voous. 1955. The distribution and relationship of *Sterna eurygnatha* Saunders. Ardea 43:226-247.

Meyer de Schauensee, R. 1966. The species of birds of South America and their distribution. Livingston Publishing Co., Wynnewood, PA.

Peterson, R.T. & E.L. Chalif. 1973. A field guide to Mexican birds. Houghton Mifflin Co., Boston.

*Accepted 26 March 1981*

# PREY-INDUCED MORTALITY OF A PIED-BILLED GREBE

ROBERT A. BEHRSTOCK, Department of Fisheries, Humboldt State University, Arcata, California 95521 (present address: Peregrine, Inc., P.O. Box 3062, Houston, Texas 77001)

On 9 January 1977 James A. Gast of Arcata, California, picked up a dead Pied-billed Grebe (*Podilymbus podiceps*) at the mouth of Maple Creek, Humboldt County, California. Because there are relatively few documented cases of natural mortalities in birds, I present some information on this one.

The grebe, a robust male, weighed 564 g, and had a wing chord of 142 mm. A Prickly Sculpin (*Cottus asper*) protruded outward between the bird's mandibles (Figure 1). The sculpin, a female, was 131 mm standard length (tip of snout to base of caudal fin), 153 mm total length, and weighed 42.4 g (preserved wet weight). It had large ovaries weighing 5.3 g, with maturing ova which caused the abdomen to bulge. The preopercular spine of each gill cover protruded slightly and appeared to be lodged in the gular skin of the grebe just posterior to the base of the mandibles. The entire gular region was examined for hemorrhaging, or obvious internal injuries. As none were discovered, I assumed the cause of death to be suffocation. Both bird and fish were in fresh condition.

Whether an intact prey item can be ingested by a predator is determined by such factors as the greatest circumference and flexibility of the prey, the width and height of the predator's gape, the elasticity of the gular area and esophagus, and the presence or absence on the prey of outward-projecting structures which could hinder ingestion. The greatest width, height and circumference of the sculpin's head were 28 mm, 21 mm and 80 mm respectively. These dimensions probably did not exceed the elasticity of the gular area of the grebe, a species which has both anatomical and behavioral traits for handling large, spiny prey.

Figure 1. Dead Pied-billed Grebe with dead Prickly Sculpin protruding from its mandibles.

*Photo by Robert A. Behrstock*

Sculpins, including *Cottus asper*, are known foods of Pied-billed Grebes (Palmer 1962). Zusi and Storer (1969), in reviewing some literature on food habits of grebes, suggested that the stout bill and heavy jaw musculature of these birds evolved to deal with heavy-bodied prey such as crawfish, frogs and fishes. Such prey items are subdued by repeated pinching and beating prior to ingestion. Wetmore (1924) stated that the pectoral and dorsal spines of a Channel Catfish (*Ictalurus punctatus*), and the claws of a large crayfish were removed prior to ingestion by a Pied-billed Grebe. Apparently, an attempt was made to swallow this fish before it was adequately subdued. The sculpin's expanded gill covers and their outward-projecting preopercular spines prevented both ejection or further ingestion, eventually causing the grebe to suffocate.

The grebe is specimen 4077 in the museum of the Department of Wildlife, Humboldt State University (HSU), Arcata, California. The sculpin is specimen 31000-28B in the Fisheries Collection, Department of Fisheries (HSU). I thank James A. Gast for turning over his unusual find, and James R. Koplin for commenting on this manuscript and encouraging my interest in fish-eating birds.

LITERATURE CITED

Palmer, R.S., ed. 1962. Handbook of North American birds. Vol. 1. Yale Univ. Press, New Haven, CT.

Wetmore, A. 1924. Food and economic relations of North American grebes. U.S. Dep. Agric. Bull. 1196. 23 p.

Zusi, R.L. & R.W. Storer. 1969. Osteology and myology of the head and neck of the Pied-billed Grebes (*Podilymbus*). Univ. Michigan Mus. Zool. Misc. Publ. 139. 49 p.

*Accepted 16 March 1982*

# CORRIGENDA

*Western Birds* 12(2), 1981 (Breeding Avifaunas of the New York Mountains and Kingston Range): p. 80. under Rufous-sided Towhee, change "*Larrea*" to "*Garrya*": p. 81. under section B. add "Hepatic Tanager (NU). A female was sitting on a nest and a male was nearby."

# AN ALBINISTIC BAND-TAILED PIGEON IN EVERGREEN, COLORADO

PAUL D. CURTIS,[1] Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, Colorado 80523

At 1230 on 26 August 1980, while making counts of Band-tailed Pigeons (*Columba fasciata*) at an artificial bait site, I observed an albinistic bandtail near Evergreen, Jefferson County, Colorado. This pigeon was with four normally-colored bandtails and landed in a tree approximately 40 m from my vehicle. I viewed the aberrant pigeon through a 15-60x spotting scope and recorded its general appearance. The feathers on the head, back and dorsal side of the wings and tail were buff-yellow to cream-colored (Smithe 1975). The tip of the tail was lighter but the terminal band was indistinct. The nape was purple-iridescent but the neck crescent was absent. The breast feathers were buff-colored. The pigeon had spectrum yellow legs and feet but a glaucous bill, and appeared similar in size to another nearby immature bandtail.

The buff-yellow plumage of this bandtail was almost certainly caused by loss of pigment or schizochroism (Harrison 1963). In Rock Doves (*C. livia*), "yellow" plumage refers to a dilute erythristic form. Both the normal eumelanin and phalomelanin pigment concentrations were probably reduced in the plumage of the observed pigeon. It could be classified as a nonmelanic schizochroic (Harrison 1966).

From May through August 1979 and 1980, I observed between 10 and 1500 Band-tailed Pigeons per day, at least four days per week, as part of a study to evaluate census methods. Despite the large number of pigeons observed, only this single bandtail with abnormal plumage was recorded.

Braun et al. (1979), handling over 30,000 bandtails, found only 18 birds with plumage abnormalities. Most aberrant pigeons in their report exhibited partial albinism (feathers with white blotching or patches of white feathers). Two of the 18 birds were classified as nonmelanic schizochroics. Entirely pale bandtails, such as the one I observed, appear to occur infrequently in wild populations.

This note is a contribution from Federal Aid to Wildlife Restoration Project W-88-R.

## LITERATURE CITED

Braun, C.E., F.J. Ward, J.A. White & R.L. Boyd. 1979. Plumage aberrancies in Band-tailed Pigeons. Southwest. Nat. 24:371-376.

Harrison, C.J.O. 1963. Grey and fawn variant plumages. Bird Study 10:219-233.

——. 1966. Alleged xanthochroism in bird plumages. Bird-Banding 37:121.

Smithe, F.B. 1975. Naturalists' color guide. Pt. 1. Am. Mus. Nat. Hist., New York.

*Accepted 18 February 1982*

[1]Address all inquiries to Wildlife Research Center, 317 West Prospect, Fort Collins, Colorado 80526.

# INDEX, WESTERN BIRDS, VOLUME 12, 1981

Compiled by *Mildred Comar*


*Accipiter cooperii*, 76, 79, 82, 84, 166
*gentilis*, 130
*striatus*, 129, 130
*Acridotheres tristis*, 114
*Actitis macularia*, 173, 178
*Aechmophorus occidentalis*, 41-46
*o. clarkii*, 41-46
*Aegolius acadicus*, 130, 133
*Aeronautes saxatalis*, 76, 78, 79
Airola, Daniel A., Recent colonization of Lassen Peak, California, by the Gray-crowned Rosy Finch, 117-124
*Aimophila ruficeps*, 75, 77, 82, 83
*Amphispiza bilineata*, 77, 80, 84, 166, 169
*Anas americana*, 54
*rubripes*, 58, 71
Anhinga, American, 70
*Anhinga anhinga*, 70
*Aphelocoma coerulescens*, 76, 79, 81, 128, 134
*Aquila chrysaetos*, 76, 79
*Arenaria interpres*, 179
*Asio otus*, 76, 82, 84
*Auriparus flaviceps*, 166, 169
Avocet, American, 23, 173, 174

Behrstock, Robert A., Prey-induced mortality of a Pied-billed Grebe, 183-184
Bluebird, Mountain, 78, 131
Western, 84, 128, 134
*Brachyramphus brevirostris*, 71
*Bubo virginianus*, 76, 79
Bushtit, 76, 78, 79, 81, 134
*Buteo jamaicensis*, 76, 79, 81, 134
*j. krideri*, 144
*lagopus*, 144
*regalis*, 143, 144
*swainsoni*, 143, 144
Byrd, G. Vernon, and C. Fred Zeillemaker, Ecology of nesting Hawaiian Common Gallinules at Hanalei, Hawaii, 105-116

*Calcarius mccownii*, 104
*ornatus*, 103-104
*Calidris alba*, 176
*alpina*, 177
*bairdii*, 176
*canutus*, 176
*ferruginea*, 174, 176
*himantopus*, 177
*mauri*, 176
*melanotos*, 176
*minutilla*, 176
*pusilla*, 176
*Callipepla gambelii*, 76, 82, 84, 160, 161, 164, 166, 169
*Calypte anna*, 77, 79, 128, 134
*costae*, 76, 80, 84, 166, 169
*Campylorhynchus brunneicapillus*, 166, 169
Cannings, Richard J., see Weber, W.
*Capella*, see *Gallinago*
Cardiff, Steven W. and J. V. Remsen, Jr., Breeding avifaunas of the New York Mountains and Kingston Range: islands of conifers in the Mojave Desert of California, 73-86
*Carduelis lawrencei*, 134
*pinus*, 131, 133
*psaltria*, 79, 80, 134, 167, 170
*Carpodacus cassinii*, 79, 80, 131, 133
*mexicanus*, 77, 80, 81, 84, 134, 160, 161, 164, 166, 169
*purpureus*, 131, 135
*Cathartes aura*, 75, 76
*Catharus guttatus*, 81, 83, 128, 129, 130, 134
*Catherpes mexicanus*, 77, 79
*Catoptrophorus semipalmatus*, 173, 178
*Certhia americana*, 130, 133, 134
*Chamaea fasciata*, 134
*Charadrius alexandrinus*, 173, 174
*a. nivosus*, 1-40
*melodus*, 15
*semipalmatus*, 174
*vociferus*, 173, 174
*Chondestes grammacus*, 134
Chickadee, Mountain, 76, 78, 82, 130, 134
*Chordeiles minor*, 130
*Cinclus mexicanus*, 141-142
*Colaptes auratus*, 134
*Colubri thalassinus*, 71
*Columba fasciata*, 134, 185
Condor, California, 139-140
*Contopus borealis*, 130, 134
*sordidulus*, 77, 79, 82, 84, 134

*Coragyps atratus*, *71*
*Corvus brachyrhynchos*, *16*
*corax*, *3*, *5*, *16*, *23*, *76*, *79*, *81*, *134*, *139*
Cowbird, Brown-headed, 77, 128, 134
Crabtree, Thomas J. and Harry B. Nehls, Checklist of the birds of Oregon, A, 145-156
Creeper, Brown, 130, 133, 134
Crossbill, Red, 131, 133
Crow, American, 16
Curlew, Long-billed, 173, 178
Curtis, Paul D., Albinistic Band-tailed Pigeon in Evergreen, Colorado, An, 185
*Cyanocitta stelleri*, *130*, *133*, *134*
*Cygnus columbianus*, *58*
*c. bewickii*, *58*
*Cypseloides niger*, *130*

*Daption capense*, *58*, *70*
*Dendroica coronata*, *79*, *81*, *131*, *133*
*nigrescens*, *75*, *77*, *78*, *80*, *81*, *129*, *134*
DeWolfe, Barbara B., see Tomback, D.
Dipper, American, 141-142
Dove, Mourning, 76, 82, 84, 134, 160, 161, 164, 166, 169
Dowitcher, Long-billed, 177
Short-billed, 177
Duck, American Black, 58, 71
Dunlin, 177

Eagle, Golden, 76, 79
Elliott, Bruce G., Defensive behavior of an immature California Condor, 139-140
*Empidonax difficilis*, *134*, *167*
*oberholseri*, *77*, *78*, *80*, *81*, *82*, *128*, *129*, *130*, *134*
*wrightii*, *83*

*Falco sparverius*, *81*
Finch, Cassin's, 79, 80, 131, 133
House, 77, 80, 81, 84, 134, 160, 161, 164, 166, 169
Purple, 131, 135
Rosy, "Gray-crowned," 117-124
Flicker, Northern, 134
Flycatcher, Ash-throated, 76, 79, 84, 134, 168
Dusky, 77, 78, 80, 81, 82, 128, 129, 130, 134
Gray, 83
Olive-sided, 130, 134
Western, 134, 167
*Fratercula corniculata*, *56*

*Gallinago gallinago*, *173*, *177*
*Gallinula chloropus sandvicensis*, *105-116*
Gallinule, Common, see Moorhen
Garrett, Kimball, see Jones, L.
*Geococcyx californianus*, *76*, *82*, *83*, *84*, *163*
Gnatcatcher, Black-tailed, 166, 169
Blue-gray, 77, 78, 79, 81
Godwit, Hudsonian, 177
Marbled, 178
Golden-Plover, Lesser, 176
Goldfinch, Lawrence's, 134
Lesser, 79, 80, 134, 167, 180
Goshawk, Northern, 130
Grebe, "Clark's," 41-46
Pied-billed, 183-184
Western, 41-46
Grosbeak, Black-headed, 77, 78, 80, 81, 128, 135, 167
Rose-breasted, 80, 81
Gull, Black-tailed, 71
California, 17
Western, 13, 58
Yellow-footed, 58
*Gymnogyps californianus*, *139-140*
*Gymnorhinus cyanocephalus*, *76*, *82*, *130*, *133*

Hawk, Cooper's 76, 79, 82, 84, 166
Ferruginous, 143-144
Red-tailed, 76, 79, 81, 134
Krider's, 144
Rough-legged, 144
Sharp-shinned, 129, 130
Swainson's, 143, 144
Heron, Black-crowned Night, see Night-Heron
Herron, Diana, Albinistic Black-necked Stilt: a second record, An, 103
*Himantopus mexicanus*, *103*, *173*, *174*
Hummingbird, Anna's, 77, 79, 128, 134
Broad-tailed, 77, 80, 81, 82, 83
Calliope, 128, 129, 130, 133, 134
Costa's, 76, 80, 84, 166, 169

*Icterus cucullatus*, *168*, *171*
*galbula*, *134*, *168*, *171*
*parisorum*, *77*, *80*, *81*, *84*, *128*, *134*, *168*, *171*

Jay, Pinyon, 76, 82, 130, 133
Scrub, 76, 79, 81, 128, 134
Stellar's, 130, 133, 134
Jones, Lee, Kimball Garrett and Arnold Small, Checklist of the birds of California, 57-72
Junco, Dark-eyed, 53, 81, 83, 128, 131, 135
"Gray-headed," 53, 81
*Junco hyemalis*, *53*, *81*, *83*, *128*, *131*, *135*
*h. caniceps*, *53*, *81*

Kautesk, Brian M., see Weber, W.
Kestrel, American, 81
Killdeer, 173, 174
Kingbird, Cassin's, 76, 83, 84
Kinglet, Golden-crowned, 131
Ruby-crowned, 81, 131, 167, 170
Knot, Red, 176
Kratt, L.F., see Young, D.

*Lanius ludovicianus*, *166*, *169*
Larson, Diane, Identification note [Ferruginous Hawk], 143-144
*Larus californicus*, *17*
*crassirostris*, 71
*livens*, *58*
*occidentalis*, *13*, *58*
*Leucosticte arctoa (tephrocotis)*, *117-124*
*Limnodromus griseus*, *177*
*scolopaceus*, *177*
*Limosa fedoa*, *178*
*haemastica*, *177*
Littlefield, Carroll D., First Oregon record of the Gray-headed Junco, 53
Longspur, Chestnut-collared, 103-104
McCown's, 104
*Lophortyx*, see *Callipepla*
*Loxia curvirostra*, *131*, *133*
*Lunda cirrhata*, *56*

Manolis, Tim, Identification quiz [Chestnut-collared Longspur], 103-104
Massey, Barbara, see Zembal, R.
Mayhew, Wilbur W., see Weathers, W.
*Melanerpes formicivorus*, *134*
*Mimus polyglottos*, *166*, *169*
Mockingbird, Northern, 166, 169
*Molothrus ater*, *77*, *128*, *134*
Moorhen, Common, "Hawaiian," 105-116
*Motacilla alba*, *70*
Murrelet, Kittlitz's, 71
*Myadestes townsendi*, *131*
*Myiarchus cinerascens*, *76*, *79*, *84*, *134*, *168*
*Myioborus pictus*, *78*, *82*
Myna, Common, 114

Nehls, Harry B., see Crabtree, T.
Nighthawk, Common, 130
Night-Heron, Black-crowned, 114
*Nucifraga columbiana*, *130*, *137-138*
*Numenius americanus*, *173*, *178*
*phaeopus*, *178*
Nutcracker, Clark's, 130, 133, 137-138
Nuthatch, Pygmy, 84, 130, 134
Red-breasted, 81, 83, 128, 129, 130, 134
White-breasted, 128, 134
*Nycticorax nycticorax*, *114*

*Oporornis tolmiei*, *80*, *82*
*Oreortyx pictus*, *134*
Oriole, Hooded, 168, 171
Northern, 134, 168, 171
Scott's, 77, 80, 81, 84, 128, 134, 168, 171
Osprey, 47-51
*Otus flammeolus*, *81*, *130*
*kennicottii*, *76*, *82*
Owl, Flammulated, 81, 130
Great Horned, 76, 79
Long-eared, 76, 82, 84
Northern Saw-whet, 130, 133
Screech, see Screech-Owl

Page, Gary W. and Lynne E. Stenzel, editors, Breeding status of the Snowy Plover in California, The, 1-40
*Pandion haliaetus*, *47-51*
Partridge, Gray, 58
*Parus gambeli*, *76*, *78*, *82*, *130*, *134*
*inornatus*, *76*, *79*, *134*
*Passerculus sandwichensis*, *170*
*Pelecanus erythrorhynchos*, *17*
Pelican, American White, 17
*Perdix perdix*, *58*
Pewee, see Wood-Pewee

Petrel, Cape, 58, 70
Phainopepla, 167, 170
*Phainopepla nitens, 167, 170*
*Phalaenoptilus nuttallii, 76, 79, 81, 83 163*
Phalarope, Red-necked (Northern), 179
Wilson's, 173, 179
*Phalaropus lobatus, 179*
*tricolor, 173, 179*
*Pheucticus ludovicianus, 80, 81*
*melanocephalus, 77, 78, 80, 81, 128, 135, 167*
Phoebe, Black, 101-102
Say's, 169
*Picoides albolarvatus, 128, 130, 133, 134*
*nuttallii, 134*
*scalaris, 76, 82, 84*
*villosus, 80, 82, 83, 130, 134*
Piest, Linden A. and Lyle K. Sowls, Records of American Wigeon breeding in Arizona, 54
Pigeon, Band-tailed, 134, 185
*Pipilo aberti, 163*
*chlorurus, 129, 131, 135*
*erythrophthalmus, 77, 78, 80, 128, 134*
*Piranga flava, 78, 80, 82, 84*
*ludoviciana, 128, 131, 135*
Plover, Black-bellied, 176
Golden, see Golden-Plover
Piping, 15
Semipalmated, 174
Snowy, 1-40, 173, 174
*Pluvialis dominica, 176*
*squatarola, 176*
*Podilymbus podiceps, 183-184*
*Polioptila caerulea, 77, 78, 79, 81*
*melanura, 166, 169*
Poorwill, Common, 76, 79, 81, 83, 163
*Psaltriparus minimus, 76, 78, 79, 81, 134*
Puffin, Horned, 56
Tufted, 56

Quail, Gambel's, 76, 82, 84, 160, 161, 164, 166, 169
Mountain, 134

Rail, Clapper, "Light-footed," 87-99
*Rallus longirostris levipes, 87-99*
Ratti, John T., Identification and distribution of Clark's Grebe, 41-46
Raven, Common, 3, 5, 16, 23, 76, 79, 81, 134, 139
*Recurvirostra americana, 23, 173, 174*
Redstart, Painted, 78, 82
*Regulus calendula, 81, 131, 167, 170*
*satrapa, 131*
Remsen, J.V., Jr., see Cardiff, S.
Rich, Terrell, First record of the Golden-winged Warbler in Idaho, 55
Roadrunner, Greater, 76, 82, 83, 84, 163
Robin, American, 134
*Rynchops niger, 13*

*Salpinctes obsoletus, 77, 79*
Sanderling, 176
Sandpiper, Baird's, 176
Curlew, 174, 176
Least, 176
Pectoral, 176
Semipalmated, 176
Solitary, 178
Spotted, 173, 178
Stilt, 177
Western, 176
Sapsucker, Red-breasted, 129, 130
"Red-naped," 58
Williamson's, 130
Yellow-bellied, 58
*Sayornis nigricans, 101-102*
*saya, 169*
Schaffner, Fred C., Sandwich Tern in California, 181-182
Screech-Owl, Western, 76, 82
*Selasphorus platycercus, 77, 80, 81, 82, 83*
Shrike, Loggerhead, 166, 169
*Sialia currucoides, 78, 131*
*mexicana, 84, 128, 134*
Siskin, Pine, 131, 133
*Sitta canadensis, 81, 83, 128, 129, 130, 134*
*carolinensis, 128, 134*
*pygmaea, 84, 130, 134*
Skimmer, Black, 13
Small, Arnold, see Jones, L.
Snipe, Common, 173, 177
Solitaire, Townsend's, 131
Sordahl, Tex A., Phenology and status of the shorebirds in northern Utah, 173-180
Sowls, Lyle K., see Piest, L.
Sparrow, Black-chinned, 77, 80, 134
Black-throated, 77, 80, 84, 166, 169

Brewer's, 161, 167, 170
Chipping, 80, 81, 82, 83, 134, 170
Fox, 129, 131
Golden-crowned, 161, 167
Lark, 134
Lincoln's, 131
Rufous-crowned, 75, 77, 82, 83
Savannah, 170
White-crowned, 161, 167, 170
*Sphyrapicus ruber*, *129*, *130*
*thyroideus*, *130*
*varius*, *58*
*v. nuchalis*, *58*
*Spizella atrogularis*, *77*, *80*, *134*
*breweri*, *161*, *167*, *170*
*passerina*, *80*, *81*, *82*, *83*, *134*, *170*
*Stellula calliope*, *128*, *129*, *130*, *133*, *134*
Stenzel, Lynne E., see Page, G.
*Sterna albifrons*, *7*, *181*
*caspia*, *13*, *17*
*elegans*, *181*, *182*
*forsteri*, *13*, *181*
*maxima*, *182*
*sandvicensis*, *181-182*
Stilt, Black-necked, 103, 173, 174
*Streptopelia roseogrisea*, *58*, *71*
Swallow, Violet-green, 76, 78, 79, 81, 134, 168, 171
Swan, "Bewick's," 58
"Whistling," 58
Swenson, Jon E., Status of the Osprey in southeastern Montana before and after the construction of reservoirs, 47-51
Swift, Black, 130
White-throated, 76, 78, 79

*Tachycineta thalassina*, *76*, *78*, *79*, *81*, *134*, *168*, *171*
Tanager, Hepatic, 78, 80, 82, 84
Western, 128, 131, 135
Tern, Caspian, 13, 17
Elegant, 181, 182
Forster's, 13, 181
Least, 7, 181
Royal, 182
Sandwich, 181-182
Thoresen, Asa C., Midsummer occurrence of the Horned Puffin in Rosario Strait, Washington, 56
Thrasher, California, 134
Crissal, 77, 82, 84
Thrush, Hermit, 81, 83, 128, 129, 130, 134
*Thryomanes bewickii*, *76*, *78*, *79*, *134*, *167*
Titmouse, Plain, 76, 79, 134
Tomback Diana F., and Barbara B. DeWolfe, Foraging behavior of a cross-billed nutcracker, 137-138
Towhee, Abert's, 163
Green-tailed, 129, 131, 135
Rufous-sided, 77, 78, 80, 128, 134
*Toxostoma dorsale*, *77*, *82*, *84*
*rediviyum*, *134*
*Tringa flavipes*, *178*
*melanoleuca*, *178*
*solitaria*, *178*
*Troglodytes aedon*, *79*, *128*, *134*, *167*
*Turdus migratorius*, *134*
Turnstone, Ruddy, 179
Turtle-Dove, Ringed, 58, 71
*Tyrannus vociferans*, *76*, *83*, *84*

Unitt, Philip, Birds of Hot Springs Mountain, San Diego County, California, 125-135

Verdin, 166, 169
*Vermivora celata*, *79*, *80*, *134*, *167*, *170*
*chrysoptera*, *55*
*virginiae*, *81*, *83*
Violet-ear, Green, 71
Vireo, Gray, 77, 80
Red-eyed, 58
Solitary, 79, 81, 82, 83
Warbling, 78, 80, 81, 83
"Yellow-green," 58
*Vireo gilvus*, *78*, *80*, *81*, *83*
*olivaceus*, *58*
*o. flavoviridis*, *58*
*solitarius*, *79*, *81*, *82*, *83*
*vicinior*, *77*, *80*
Vulture, Black, 71
Turkey, 75, 76

Wagtail, White, 70
Warbler, Black-throated Gray, 75, 77, 78, 80, 81, 129, 134
Golden-winged, 55
MacGillivray's, 80, 82
Orange-crowned, 79, 80, 134, 167, 170
Virginia's, 81, 83
Yellow-rumped, 79, 81, 131, 133

Weathers, Wesley W. and Wilbur W. Mayhew, Time of day and desert bird censuses, 157-171
Weber, Robin R., see Weber, W.
Weber, Wayne C., Richard J. Cannings, Brian M. Kautesk and Robin R. Weber, Second documented record of the Black Phoebe in Canada, 101-102
Whimbrel, 178
Wigeon, American, 54
Willet, 173, 178
Wood-Pewee, Western, 77, 79, 82, 84, 134
Woodpecker, Acorn, 134
Hairy, 80, 82, 83, 130, 134
Ladder-backed, 76, 82, 84
Nuttall's, 134
White-headed, 128, 130, 133, 134
Wren, Bewick's, 76, 78, 79, 134, 167
Cactus, 166, 169
Canyon, 77, 79
House, 79, 128, 134, 167
Rock, 77, 79
Wrentit, 134

Yellowlegs, Lesser, 178
Greater, 178
Young, Donald A. and L.F. Kratt. Dippers capturing fish during winter in the Yukon territory, 141-142

Zeillemaker, C. Fred. see Byrd, G.V.
Zembal, Richard and Barbara W. Massey, Census of the Light-footed Clapper Rail in California, A, 87-99
*Zenaida macroura*, *76*, *82*, *84*, *134*, *160*, *161*, *164*, *166*, *169*
*Zonotrichia atricapilla*, *161*, *167*
*iliaca*, *129*, *131*
*leucophrys*, *161*, *167*, *170*
*lincolnii*, *131*

Sharpen your identification skills on this photo. The bird's identity will be revealed in the next issue of *Western Birds*.

**Volume 12, Number 4, 1981**

A Checklist of the Birds of Oregon
*Thomas J. Crabtree and Harry B. Nehls* 145

Time of Day and Desert Bird Censuses
*Wesley W. Weathers and Wilbur W. Mayhew* 157

Phenology and Status of the Shorebirds in Northern Utah *Tex A. Sordahl* 173

NOTES

A Sandwich Tern in California
*Fred C. Schaffner* 181

Prey-induced Mortality of a Pied-billed Grebe
*Robert A. Behrstock* 183

An Albinistic Band-tailed Pigeon in Evergreen, Colorado
*Paul D. Curtis* 185

BULLETIN BOARD 186

INDEX *Mildred Comar* 187

*Cover photo by Ray Ekstrom:* Saw-whet Owl *(Aegolius acadicus),* 20 October 1976, Killgore Hills in Shasta Valley near Yreka, Siskiyou County, California. Nikkormat FTN, 200 mm lens with flash, f/8, K-64 film.

Manuscripts should be sent to Alan M. Craig, P.O. Box 374, Lakeview, CA 92353. For matters of style consult *Suggestions to Contributors to Western Birds* (6 pp. mimeo available at no cost from the Editor) and *Council of Biology Editors Style Manual* 4th edition, 1978 (available from the American Institute of Biological Sciences, 1401 Wilson Boulevard, Arlington, VA 22209 for $12.00).

Papers are desired that are based upon field studies of birds, that are both understandable and useful to amateurs, and that make a significant contribution to scientific literature. Appropriate topics include distribution, migration, status, behavior, ecology, population dynamics, habitat requirements, the effects of pollution, the techniques for identifying, censusing, sound recording and photographing birds in the field. Papers of general interest will be considered regardless of their geographic origin, but particularly desired are papers dealing with studies accomplished in or bearing on Rocky Mountain states and provinces westward, including Alaska and Hawaii, adjacent portions of the Pacific Ocean and Mexico, and western Texas.

Authors are provided 50 free reprints of each paper. Additional reprints can be ordered at author's expense from the Editor when proof is returned or earlier.

Good photographs of rare and unusual birds, unaccompanied by an article but with caption including species, date, locality and other pertinent information, should be submitted to Don Roberson, P.O. Box 985, Pacific Grove, CA 93950.